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The Emu

A Quarterly Magazine to popularize the Study and Protection of Native Birds and to record Results of Scientific Research in Ornithology.

Official Organ of the ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION.



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AUSTRALIAN GREEN-BACKED FINCH.
Erythrura trichroa macgillivrayi

The Emu

Official Organ of the Royal Australasian Ornithologists' Union.

"Birds of a feather."

VOL. XVIII.]

1ST JULY, 1918.

[PART I.]

Australian Green-backed Finch (*Erythrura trichroa macgillivrayi*).

BY J. A. KERSHAW, F.E.S., CURATOR, NATIONAL MUSEUM,
MELBOURNE.

THE specimen illustrated is probably the first example of this bird taken in Australia, and the second to be recorded.

It was obtained by the National Museum, with other Queensland skins, in March, 1891, from F. Ayres, who collected it in North Queensland in 1890.

It was then identified as *Erythrura cyaneifrons*, Layard, but, as some doubt was entertained as to its being Australian, it was not recorded.

In 1914, while in company with Dr. W. Macgillivray, president R.A.O.U., and Mr. W. M'Lennan, on Lloyd Island, North-East Queensland, the latter secured a Finch which I recognized as being similar to the bird previously collected by Ayres. This specimen has been recorded by Mathews (*A. A. Rec.*, ii., p. 103, 1914) as a new sub-species, but he quotes the locality as Claudie River instead of Lloyd Island,* and states that it differs from *E. t. cyaneifrons* in its larger bill, deeper blue coloration on the forehead and cheeks, deeper-coloured upper tail coverts and tail, and longer wings.

The specimen here dealt with approaches very closely to *E. cyaneifrons*, the total length and measurement of the bill being practically the same, not larger, as in the Lloyd Island specimen, according to Mathews, and it possesses the blue chin noted in Sharpe's key to the species. The wing, however, is somewhat longer. Mathews, unfortunately, only gives the length of the wing—62 mm.

Total length, 121 mm.; wing, 62 mm.; tail, 50 mm.; culmen, 11 mm.

The specimen figured is a male, and is in the National Museum, Melbourne.

* See *Emu*, vol. xvii., pp. 73, 208.

Notes on Some Additions to the H. L. White Collection.

BY A. J. CAMPBELL, C.M.B.O.U., MELBOURNE.

AT the request of Mr. H. L. White, and by the courtesy of both the Director (Prof. Sir Baldwin Spencer) and Curator (Mr. J. A. Kershaw, F.E.S.) of the National Museum, Melbourne, I examined some valuable additions to the "H. L. White Collection," now in that institution.

One lot was recently collected for Mr. White by Mr. F. L. Whitlock in the region of North-West Australia proper.

I offer these few and somewhat abrupt comments on selected species, compared with other available material, and with special reference to Mr. G. M. Mathews's "List of the Birds of Australia" (1913), upon which he is founding his more important and permanent work, and purely in the interests of our mutual study—"The Birds of Australia." And in making these comments I do so entirely of my own volition, and in no way whatever compromise the opinion of Mr. White, or of any other of the gentlemen before-mentioned, on the points raised.

The names are those in vogue in the "Official Check-list" of the R.A.O.U. I take the Century Dictionary's definition of a sub-species: *a climatic or geographical race recognizably different from another, yet not specifically distinguished.*

Regarding colour alone, the question is, What is sufficient variation to be regarded as a sub-specific difference? I would suggest at least either two tones in the tonal scale or two hues in the chromatic scale, and a tone or hue that is persistent and can be named according to modern chromatology.* Otherwise, your description is indefinite. "Differs from so-and-so in its darker coloration above," or "in its paler coloration," are no better descriptions than if they were "nude names."

I would further define my position by stating the following negative reasons † why I consider a bird should not be recognized as a sub-species, namely:—

- (1) When characters are not sufficiently conspicuous so that they can be stated in clear language or figures.
- (2) When characters cannot be recognized without knowledge of the geographical origin of the specimen.
- (3) When characters do not distinguish corresponding ages or sexes of two forms.
- (4) When difference in dimensions is less than 10 per cent.

Cracticus nigrogularis. Black-throated Butcher-Bird.

Two skins from the Upper Coongan River appear identical with the eastern bird, except that the ends of the primaries and

* I find "Colour Standards and Nomenclature" (Ridgway) the most suitable for naturalists.—A. J. C.

† These are not new. See *Auk*, Oct., 1905; also *Emu*, v., p. 172.

secondaries may be more brownish. The intensity of the black portions of the plumage varies in individuals, and so does the length of the bill.

Dr. E. Hartert, who is a keen discerner of sub-species, remarks (*Nov. Zool.*, xii., p. 229), touching birds from Nullagine and the Coongan:—"These specimens belong to the larger *C. n. nigrogularis*, the distribution of which is peculiar, as it seems to occur in New South Wales and throughout Western Australia, and is only replaced by the smaller *C. n. picatus* in the Northern Territory and in the northern portions of Queensland."

Apart from these two tolerably clear types, Mathews's numerous "subs" for this species are confusing and conflicting to a student. In addition to the smaller northern form, *picatus*, he debits us with two others—*tormenti* and *territori*—both practically from the type region of the first-mentioned—North Australia.

Gymnorhina longirostris. Long-billed Magpie.

Mr. Whitlock collected a male and two females on the Coongan, which are interesting because from, or near, the type locality (Ashburton River and Nullagine).

Dr. Hartert states they differ from *G. t. tibicen* in their "larger size." Probably he intended to refer to the bill only, because in the other dimensions the western birds are smaller, and correspond with Mathews's *G. t. terræ-reginæ*, one specimen of which in the "H. L. White Collection" is marked "Identified by G. M. M." Both *longirostris* and *terræ-reginæ* incline to the light-coloured tibia, although one of the males of the Coongan birds has the tibia black, as also has a male from the Northern Territory. The Coongan specimens appear more weather-worn than the Northern Territory birds, otherwise they resemble each other.

Geopelia tranquilla (placida). Ground-Dove.

One male, from the Coongan. This appears a tangible sub-species of Mathews (*G. p. clelandi*), and corresponds with his plate xxxii. (back fig.), "Birds of Australia," vol. i.

Turnix velox. Little Quail.

Pair from Coongan. There is no difference in coloration or measurements from specimens collected in New South Wales or Victoria. Moreover, Hartert states he has examined *T. velox* collected at Nullagine (*Nov. Zool.*, xii., p. 195), the Coongan region. Mathews figures *velox* for the North-West, but has since introduced his "pallid" form—*vinotincta*.

Halcyon obscurus. Northern Red-backed Kingfisher.

Male and female, from Coongan. Representatives of a good sub-species (of *pyrrhopygia*) as indicated on the R.A.O.U. "Check-list," p. 57. In this species the ♀ usually appears more dingy in coloration than the ♂.

Merops ornatus. Australian Bee-eater.

Two males collected at the Coongan River. One, in perfect plumage, perhaps more golden about the head than is usually the

case, exactly corresponds with one (of a pair) collected at Kow Plains, Victoria. Mathews refers to the western bird as *short-ridgei*.

Referring to the migration of *Merops* from New Guinea, Mr. H. G. Barnard has kindly furnished me with some of his field observations. The continuous line of migration noticed from Cape York to near Port Darwin—a distance of about 800 miles—is a most important record. The following are Mr. Barnard's remarks:—

"During a collecting trip to the east coast of New Guinea in the years 1894-5 I observed *Merops ornatus* on Kiriwina Island, one of the Trobriand Group. During the winter of '95 they were then in moulting plumage; as the spring came on they disappeared, and were not seen again.

"In September, '96, while on my way to Port Darwin, I observed these birds, when nearing Cape York, coming from the direction of New Guinea: they were passing in flocks of from four or five up to fifty or more, many of the flocks close together. In other instances they were far apart. Some were skimming the water, others hundreds of feet in the air. This continued all the way to Thursday Island. During my stay of two days at this place the flight still continued, many birds resting on the trees on the island. The same thing was noticed nearly the whole way to Port Darwin, but in much fewer numbers. I spent several weeks at the latter place before returning to Cape York. On the return journey no Bee-eaters were observed passing overhead, but were seen on the mainland at the Cape on my arrival in October. The following March I observed them leaving for the direction of New Guinea: this flight continued for some time. Again, in 1910, while on a trip to Cape York for Mr. H. L. White, I observed the same occurrence in September. During the winter of 1913, while on the Macarthur River, Northern Territory, Bee-eaters began to arrive in August, but were not then in full breeding plumage. By September they had assumed full plumage and started breeding.

"On the Dawson River, Central Queensland, birds arrive during August and September, but not in full plumage. This they assume shortly afterwards, when they commence their burrows. After burrow-drilling it is a hard matter to obtain perfect specimens, as the birds break the ends off their beaks in the hard ground; the long central tail-feathers are also fractured. The birds leave again for the north from February to April, though, owing to very mild winters, I have known instances of a few Bee-eaters remaining till the spring."

Melithreptus lætior. Golden-backed Honey-eater.

Northern Territory (Borrooloola and Brunette Downs) specimens are similar to typical *M. lætior*, and cannot be separated from Coongan specimens. It would appear as if Mathews's *M. coongani* becomes a synonym.

Myzantha lutea. Yellow Miner.

Female. Palest skin of this kind in the "H. L. White Collection." (Wing $4\frac{1}{2}$ inches, or $\frac{1}{2}$ inch shorter than typical birds from Napier Broome Bay.) Like others from North-West Cape, this Coongan bird comes nearest Mathews's *wayensis*, evidently a more pallid form of *lutea*. The Great Sandy Desert, in this case, appears to operate between the true *lutea* and *wayensis*:

Ptilotis sonora. Singing Honey-eater.

Gould, who was a good judge of species, stated that he had "abundant evidence that the range of this species extends across the entire continent of Australia from east to west." If that be correct, it is feared that many of Mathews's subs, notably *murichisoni*, *decipiens*, *rogersi*, and *cooperi*, dissolve into one, which may, in general, be a trifle brighter-coloured than, say, those from Victoria or South Australia.

More recently Mathews desires to shift the type locality to Shark Bay. Scarcely will his new genus, *Dorothina* (pretty name though it be), stand, although he has discovered that *Meliphaga* (Lewin) is similar to the name *Melophagus* (Latrielle), for an insect! Why not retain the well-known name *Ptilotis*, and put confusion out of court? Whitlock collected skins on Barrow Island as well as at Cossack, on the mainland. Both examples are similar and typical.

Ptilotis carteri. Carter Honey-eater.

A pair (♂ and ♀) from the Coongan are typical specimens, and probably more than a sub-species, as the R.A.O.U. "Check-list" indicates.

Ptilotis keartlandi. Kearthland Honey-eater.

Coongan or Marble Bar birds appear the same as those from the more central (type) locality. Some Western *individuals* may be paler in colour, but not paler than North's original figure.* For instance, one (♀) taken on the Coongan agrees with Mathews's *mungi*. However, Hartert recognizes the western birds as *keartlandi* (*Nov. Zool.*, xii., p. 233).

Stigmatops ocellaris. Brown Honey-eater.

A review of a large series of this widely-distributed species makes it appear that, at most, there are only three races—eastern (*ocellaris*), western (*indistincta*), and northern (*rufescens*, with which Mathews's two other subs—*perplexa* and *media*—are apparently synonymous).

Myzomela nigra. Black Honey-eater.

This Western race is smaller than the Eastern (*ashbyi*).

Ephthianura tricolor. Tricoloured Bush-Chat.

Paler-coloured than the Eastern bird (*assimilis*). Does either

* "Horn Expedition—Zoology," pl. 6.

size only or slight variation of colour constitute a scientific warrant for separating a sub-species? I think not.

Emblema picta. Painted Finch.

Mathews states (*Nov. Zool.*, xviii., p. 428) that the Coongan birds (*E. p. coongani*) are paler in coloration than those from Gould's type locality, thought to be Derby. It does not appear so, according to the latter's plate 97, vol. iii., "Birds of Australia." Two skins (♂ and ♀) in the "H. L. White Collection" from the North-West Cape are identical with Coongan specimens collected by Whitlock. Mathews now pronounces Gould's type locality to be Depuch Island, near the coast, between Cossack and Yule River (*A. A. R.*, ii., p. 102). That being the case, all these North-Western (proper) birds are doubtless Gould's true *Emblema picta*.

In plumage the dark under parts vary in individuals. Some are black, others more brownish, while the scarlet markings, in instances, are absent from the throat, or altogether from the under surface.

Pomatorhinus rubeculus. Red-breasted Babbler.

The well-defined "Red-breasted" Babbler appears to inhabit the North-West and the great interior. These specimens (two ♀ from Upper Coongan) answer Mathews's *nigrescens*, which is the darkest race of this species. However, it is questionable whether there be a tangible sub-specific difference between *nigrescens* and the real *rubeculus*, from Derby. I think Mr. Mathews will find that North-West Australia is Gould's type locality, and not "Port Essington, N.T.," as quoted in his (Mathews's) "1913 List," p. 202.

Artamus personatus. Masked Wood-Swallow.

Male and female from type region (W.A.) Eastern birds (*munna*) are larger and darker, but there is less difference between the respective females.

Melopsittacus undulatus. Warbling Grass-Parrot.

A female. Slightly paler in colour than typical specimens, but the skin is marked "immature." I venture the opinion, after examination of much material, that the "Check-list" Committee will find great difficulty in separating ornithologically either of Mathews's subs—*intermedius* and *pallidiceps*—of this interesting little species of wide-world aviary fame. One has to consider the various and extreme seasons these birds have continually to contend with travelling throughout their extensive inland habitat. In this connection there is a very interesting note by Dr. Wm. Macgillivray in *The Emu*, xiii., p. 158.

Malurus assimilis. Purple-backed Wren-Warbler.

The true Eastern *M. lamberti* appears to be a very separate form (sub-species), while *M. assimilis* is more mixed, and extends right across the inland provinces of the continent. It is a poor race, or variety, that one cannot name except one knows the locality it is from. Of the *assimilis* type, the Dawson bird, on the

east, with its larger bill, and the Bernier Island bird, on the west, with the lighter chestnut shoulders, may both be picked out.

Two fine Coongan River skins (*assimilis*) may be either Mathews's *mungi* or *occidentalis*. In any case, none of the *assimilis* type possesses a blue breast, as indicated by that author's "vernaculars." The throat and breast are always deep black.

Pœcilodryas pulverulentus (leucura). White-tailed Shrike-Robin.

Birds collected by H. G. Barnard and myself at Cardwell, North Queensland, appear similar to Northern Territory specimens, from which Mathews's *connectens*, from the farther North-West, are doubtfully separable. Two males F. L. Whitlock collected at Cossack are probably not fully adult, the plumage being slightly streaked or striated, especially on head and mantle. These are no doubt Hartert's *cinereiceps*, which may be distinguished from eastern and northern coast birds by their decidedly lighter colouring.

Pachycephala lanioides. White-bellied Whistler.

Whitlock's collection contained two males and a female of this fine species from Cossack. The males appear similar to Gould's figure of farther North-Western birds. But the female (like those also from Port Hedland) is darker (brownier), and has the shaft-lines of the under surface more pronounced than, say, Roper River (N.T.) specimens. It is presumed Mr. Mathews will accept De Vis's *fretorum* (although the description is not very satisfactory) for the more eastern race should it be proved to differ from *lanioides*. Except it be in the skinning, Roper River birds show a greater-sized patch of black on the chest than do the Cossack skins.

Dimensions in mm., Cossack specimens, according to collector's tabs:—

♂.—Length, 183–200; wing, 96–98; tarsus, 26–30; culmen, 17–20.

♀.—Length, 122; wing, 92; tarsus, 25; culmen, 20.

Zosterops balstoni. Carnarvon White-eye.

Three beautiful skins (♂) from Barrow Island, apparently a safe sub (*balstoni*, Grant). They are similar to skins from Port Hedland and North-West Cape. Seemingly the Great Sandy Desert divides *balstoni* from the true *lutea* in the farther North-West (Kimberley). There is no difference between farther North-West and Northern Territory (type locality) specimens—both *lutea*. That being so, how can Mathews sustain his two subs—*hecla* and *tribulationis*—for the farther North-West?

Cacatua sanguinea. Blood-stained Cockatoo.

Female. An interesting skin obtained on an island of Dampier Archipelago, 30 miles off the mainland. Wing, $9\frac{1}{2}$ inches, or an inch less than Lake Way birds. The island bird is also cleaner (whiter), and has the yellow parts of the plumage clearer lemon colour. It would be worth while examining more material of these island-breeding birds,

I was exceedingly glad personally to handle a skin of the White Cockatoo that frequents Dampier Archipelago, because, from reliable information, I thought, I called the Dampier Cockatoo *Licmetis pastinator* in my "Nests and Eggs." Obviously it should have been *Cacatua sanguinea*.

This is probably the oldest known Australian Cockatoo, for, when Dampier, the navigator, in 1699, was in the neighbourhood of the archipelago that now bears his name, off North-West Australia, he recorded there was a "sort of white Parrot which flew a great many together." Although the earliest known Cockatoo, up to date its name or names are by no means settled. Mr. Mathews, by much laborious research, has at last ("Birds of Australia," vol. vi., pp. 211, 212) narrowed things somewhat towards logical conclusions. But it is a pity he dispenses altogether with the old and familiar name *gymnopsis* ("remove not the ancient landmark which thy fathers have set" may be read metaphorically), while he introduces six other sub-specific (even *secondary* sub-specific) names of his own, for the species. The name *gymnopsis* may have been inappropriately applied in the first instance, yet Mr. Mathews could have used it by "designation" for the race he now calls *ashbyi*, from the interiors of Queensland, New South Wales, and South Australia. It will be observed that the wing measurement I give for the Dampier bird—namely, $9\frac{1}{2}$ inches, or 240 mm.—agrees with the female measurements of Mathews's small so-called race, *normantoni*, from the Gulf country, Queensland.

Birds of Lake Victoria and the Murray River for 100 Miles Down Stream.

BY CAPT. S. A. WHITE, C.M.B.O.U.

OWING to news coming to hand that since the River Murray had been in flood this past season (1917), water-birds of many species had congregated in great numbers over the flooded areas to nest, the writer and his ornithological friend of many years' standing, Dr. A. M. Morgan, determined to make a trip to Lake Victoria, and, after working that district, to examine the ornithology of the river for a hundred or more miles further down.

It may be as well to give a few facts relating to the river and the country over which we observed. The River Murray was first discovered and followed to its mouth by Capt. Sturt, who started down the Murrumbidgee in a whaleboat on 7th January, 1830, and reached Lake Alexandrina on 9th February of the same year. He then went on over the lakes and traced the river to its mouth into the ocean. Sturt returned by the same route, reaching his starting-point on 23rd March, completing the longest boat journey ever undertaken by the Navy. The Murray River is navigable for 3,212 miles, and passes through a great valley

known as the "Murray Basin." It is stated by geologists that the plains of the great basin have been formed by the silting-up of a large arm of the sea which opened out to the ocean not far from where the present Murray mouth is, and that the arm or inlet extended as far into the interior as Menindie. For the first two hundred miles fossiliferous remains are found in great quantities in the river cliffs. These cliffs constitute a notable feature of the country. It is seldom the cliffs come in to face each other, on either bank of the river; but in the general case there are cliffs or high lands on one bank and low flats (which at flood time are all under water) on the other. Sometimes the river passes through flats covered in *Eucalyptus rostrata* (Red Gum) and *E. microtheca* (Swamp Box) to the cliffs on either side which mark the valley. The cliffs in many places are hundreds of feet high. Those for the first two hundred miles are of marine limestone formation, of Miocene and Eocene age; then further up a great change takes place, and they become unfossiliferous sandstone, also of Tertiary age, and strongly coloured with oxide of iron. Here the plain or flat through which the river has cut its twisting course is much wider, the cliffs being much further apart.

Lake Victoria occupies an area of 25,600 acres, and at the time of our visit was full to overflowing. Lake Victoria was discovered and named by Mr. Howden in 1838, and will soon play a very important part in the locking of the Murray River; the water finds its way in and out of the lake by the Frenchman and Rufus Creeks. The Rufus Creek was the scene of a fierce but very unequal conflict between the natives and a force of police and overlanders in the early days. The blacks were almost exterminated; only one woman with a child on her back escaped by swimming across the river. The creek ran red with the unfortunate natives' blood. That this district should have been a stronghold of the natives can easily be understood, for it abounded in game and wild fowl of all kinds. The red gum timber is very fine all along the creeks. The distance separating the lake from the river is about four miles.

On 28th September, 1917, the writer left by rail for Morgan, then on by car to Renmark. Many birds were observed as the car passed through the mallee or dashed along the bush track out in the open, with a waving mass of spear-grass, 3 to 4 feet high, on each side. In one place a small party of Emus afforded me a lovely sight, as they kept up with the car for quite a distance. Reaching Renmark that night, I was a day ahead of my medical friend; this was arranged so that I might see to the equipment, cook, stores, boats, &c. Next day kept me busy arranging matters, and that evening my mate joined me.

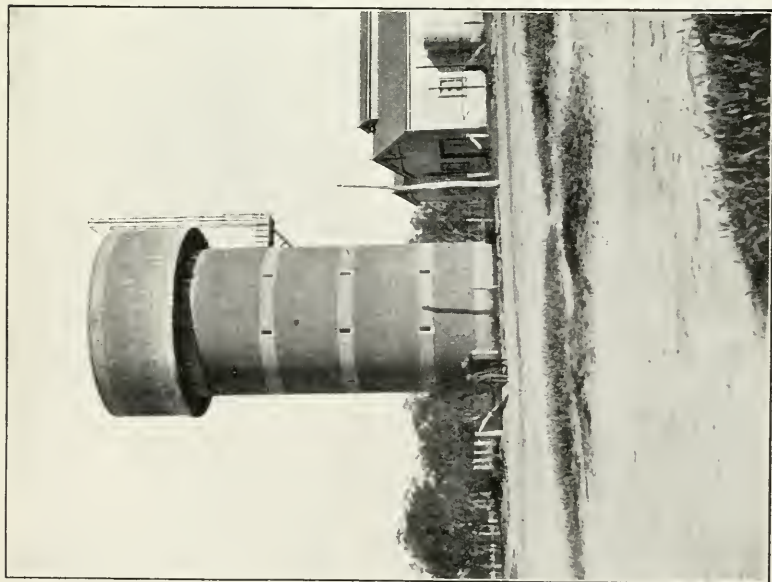
The following day being Sunday, we walked along the edge of the flooded country and made many bird observations. Along the edge of the long backwater or lagoon grew fine red gum trees up to their first branches in water; out further there was a mass of water plants, out of which came the harsh call of the Bald-

Coot. A pair of these fine birds, with dark blue breasts, red bills and legs, on the edge of the swamp, were so quiet that they allowed me to focus the camera. The loud laugh of the Great Brown Kingfisher echoed away through the timber. White-plumed Honey-eaters, Blue-faced Honey-eaters, and others were seen. Moor-Hens slipped into the water from the bank as we passed along. Out in a clear patch of water the Australian Coots could be easily distinguished by the almost white shields on their heads. Dainty little Land-Rails went bobbing in and out amongst the vegetation on the edge of the water. We visited the water tower in the town that afternoon, and found the Fairy Martins nesting in thousands under the projecting top of the tower, their strange, retort-shaped nests being attached to the masonry. Unfortunately, the imported House Sparrow was driving many of the Swallows away and taking possession of their nests; it was aggravating to see a Sparrow thrust its head out of the bottle-shaped nest.

Next morning we were up with the light, to see that our boats and stores were put on board the steamer. At 7 a.m. the river steamer threw off from the bank and proceeded up-stream. It was a wonderful sight. The mighty river was running swiftly, awash with the banks, and in many places over them. Swiftly it rushed through the old gum-trees; the latter had not seen such a flood since 1870. All day we steamed along this great waterway. As darkness set in, the powerful electric head-lights of the steamer shone upon the giant trees on either bank and showed up great scars, 12 to 20 feet in length, on some of the trees, marking where the happy blackfellow (in those days) had cut a canoe from the thick bark of the tree. It was in the small hours of the morning that Lake Victoria Station was reached. The steamer pulled into the bank, and we soon launched our boats and tied them up to the bank, while we landed our stores and baggage on shore; then the quaint old river steamer backed out, and proceeded on her way. Leaving our luggage, we took our blankets, and found our way to the gate of the fence which enclosed the homestead, and walked up a path of a well-kept garden, which we could just make out in the starlight. As soon as we reached the verandah we curled up in our blankets and went to sleep. It can easily be understood how surprised the housekeeper and her husband were to find, at sunrise, three men in possession of the verandah. Explanations were forthcoming, and Mr. Armstrong's letter of invitation shown. We then learnt that the owner, Mr. J. B. Armstrong, was out at the back station, where shearing operations were proceeding. This visit to Lake Victoria Station savoured much of the Arabian Nights, for we arrived in the darkened hours of the morning, awoke to find we were in a beautiful garden, full of flowers and fruit, servants to wait upon us, and everything we required was supplied, yet not once did we see the owner. For seven or eight days we were waited upon, each day going out by land or water, and coming back in the evening



Nests of Diamond-Birds scratched out by the cunning fox.



Remark Water Tower, under the projecting top of which Fairy Martins nest.

to a brightly-lit dining table and cheerful fire. Our thanks went out a hundred times to our invisible host.

We started our ornithological work earnestly on 2nd October. Walking along the edge of the flooded country, we were attracted by some deep wash-outs in the side of a hill, and here great numbers of Diamond-Birds were nesting. The greatest enemy of birdkind, the imported fox, had discovered these birds' nesting burrows, and in many cases had scratched them out for the eggs or young. Another bird was nesting in these banks, and that was the Red-backed Kingfisher. The Pale-yellow Parrot was very numerous. Many Honey-eaters, attracted by some flowering box-trees, were observed, and the harsh calls of the waterfowl came from the flooded area. After lunch we manned one of the boats, and after a hard pull against a strong current made our way into one of the swamps. Here we saw a great sight—miles upon miles of swift-running water, over country which, in normal times, would be a box flat, with lignum bushes from 12 to 14 feet high growing upon it; but at this time only a third of the box-trees was out of water, and only the tops of the lignum bushes. Amidst this great swamp thousands of water-birds had congregated to nest. The Black-tailed Native-Hen, the Moor-Hen, Australian Coot, and, at rare intervals, the Bald-Coot, would slip off the tops of the floating lignum bushes and swim away through the maze of light-green tops of bushes and trees. We found the Moor-Hens' nests placed just above the water in the lignum bushes. The Coot made its nest of water grasses and other material, always floating on the water, but so placed on the side of the bush that it could not be swept away by the current. We spent a delightful time in the haunts of the water-fowl. Snakes were numerous, and it was a frequent occurrence to discover a tiger or carpet snake coiled up on the top of a bush, on a branch of a tree, or a hollow limb. Often when the boat was under a dead tree-spout, and the writer pulled himself up by his hands to examine a likely Duck's nest, he would meet the gaze of a goanna or a snake at far too short a range. These reptiles are responsible for the disappearance of many eggs and young birds. The clear, ringing notes of the Yellow-throated Friar-Bird were often heard, and over the water they sounded more musical than ever. This bird must have been described from an immature specimen, for they have a yellow throat only in the early stage of life.

Next day set in wet; heavy showers fell all the morning, and we congratulated ourselves, and thanked our invisible host, for being in such comfortable quarters. About 3 p.m. the weather broke, and we went along the flood waters on the high ground. No new birds were recorded. Rain set in again, so we returned. The following day thunderstorms passed over continuously, with heavy rain, which prevented our doing much work.

On Friday we started out in one of the boats, and spent most of the day amongst the water-birds. Grey Teal, Black Duck,

and the Maned Goose were plentiful, and mostly in pairs, showing that they were nesting. The Maned Geese, or Wood-Ducks, were very quiet, for often when we passed through the garden gate several of these handsome birds would be feeding on the grass close to the gate, and when we passed out they would only move to one side to let us pass by. In a lucerne paddock close to the house numbers of beautiful White Egrets, White-necked and White-fronted Herons, could be seen at any time during the day. All this spoke volumes for the owner of the station, for he can never allow any shooting near the homestead, or these birds would not be there. In the late afternoon Dr. Morgan went out in the swamp again, taking Harris, our man, to assist him. The writer went along the flooded area with camera to take photographs of the foxes' work in scratching out the birds' nests.

Saturday morning, Mr. Smyth, of the adjoining station, "Nimpoo," called with his car and took us "out back" to his brother's place, where the soil was covered in a dense mass of spear-grass 4 feet high. The timber was chiefly mallee, pine, and sandal-wood. We saw a good many birds, amongst them the Pallid Cuckoo, Yellow-throated Miner, and the beautiful Yellow-vented Parrot in small flocks. The Gilbert Thickhead was often seen and heard. When we emerged upon some more open country the Tricoloured Chat, like crimson spots, moved on before us. The Little Quail was also numerous. We returned by way of Lake Victoria. As evening was coming on, and the sun was setting, we had a splendid view of the lake, the vast expanse of water, with a fine fringe of gum-trees in the foreground, and the declining sun shining on the sand-hills and cliffs, on the far side, made a wonderful picture, set in a great waving mass of spear-grass. On our way back we met with several flights of the beautiful Black-tailed Parrots; they were making into the timber on the river from their feeding-grounds out-back. Their swift and elegant flight, combined with their rich yellow coloration, coral-red bill, and black tails, renders them most conspicuous.

Next day was taken up curing specimens, writing-up notes, and taking photographs. My companion went out in the afternoon and procured a Red-capped Babbler; this bird was taken on an island up-stream.

Next morning Mr. Smyth again called for us, and kindly motored us over to where the Rufus Creek enters the lake. It was a bright morning, and we approached Lake Victoria on rising ground. When we reached the crest, the lake in all its grandeur opened out before us, with a fine flock of Swan sailing on its surface. We could not get anywhere near the Wentworth Bridge, over the Rufus, for it was well under the flood waters. Having procured a boat from a Government caretaker, we pulled down along the Rufus Creek, the creek being marked only by gum-trees half submerged along the banks. The air was laden with the sweet scent of the Murray lilies. We turned, with a strong current, into a great swamp, out of which the green tops of



Water-birds' Paradise, Murray River.
Lignum bushes and red gums are conspicuous.



Examining a Black Duck's Nest.

lignum bushes and trees were showing. The harsh cries of water-fowl could be heard on every side, and we were soon busy taking notes and making observations. We were surprised to see the little Blue Wrens and their cousins, the Red-shouldered Wrens, moving about in the almost submerged lignum bushes. The weird, long-drawn call of the Grass-Bird could be heard coming from every bush, and many of their lovely little nests were seen. Numbers of nests of the Coot and Moor-Hen were observed. At mid-day we pulled the boat over to a picturesque little island. The boat was made fast, and we landed, boiled the billy, and did justice to lunch amidst the glories of Nature and a veritable bird paradise. Before we left the island a large fox, that had been feeding upon eggs and birds, took to the water from the island. We pulled out after Reynard, and despatched it in the water.

Wednesday, 10th October, we were on the move early, loading up the boats; said good-bye to our kind friends, and started down the river with a boat and luggage in tow. We cut off a good many bends in the river where the stream ran swiftly between the timber. Great watchfulness had to be exercised in keeping our boats from being dashed against the tree-trunks. At noon we made into the first piece of dry land we had seen since starting, and it was only a few inches above water. The glorious song of Gilbert's Thickhead (*Pachycephala gilberti*) came from the tea-tree scrub. Landing at a very picturesque spot, we had dinner. Then my friend and I took a turn through the scrub. A good many Black-tailed Native-Hens went running away in front of us, like so many dark-coloured Bantams. The rich call of the Shrike-Thrush was often heard, also the weird note of the Black-eared Cuckoo. Whistling-Eagles and Noisy Miners were seen. A large Varanus, or goanna, went scuttling up a big tree; it was the largest specimen of the species the writer had ever seen. It was 7 o'clock this evening before we could find land high and dry enough to pitch our camp upon. With some difficulty we poled the boats through the thick timber till a steep bank of yellow sand covered in Murray pine was reached. The night was very mild, and we all lay down to sleep in the open. It was discovered that we were close to Millewa, and had made 38 miles downstream. The first bird to attract our attention in the morning was the Mallee Parrot. Brown-headed Honey-eaters were very noisy. Gilbert's Thickhead was calling loudly. The unmistakable tracks of an Emu were seen. Returning to camp, we had lunch and went on board, and were very soon on our way again. White-rumped Wood-Swallows were seen in small parties amongst the partly-submerged gum-trees. We soon passed over the border into South Australia. The boundary fence between Victoria and South Australia was seen, and that between New South Wales was passed some 8 miles further up stream. At 4.30 p.m. we called at Chowilla for our mail, and the owner, Mr. R. Robertson, was hard at work trying to save the stock from the flood waters, which had risen to his house. Having our mail, we moved on,

and, reaching a sharp bend in the river, a high bank was seen, and here we pulled in for the night. A White-throated Nightjar was disturbed from the bend of a tree as we landed, and Boobook Owls were calling during the night.

Next morning the writer had some specimens to cure, and while this was being done Dr. Morgan went off into the scrub, where he discovered a Spiny-cheeked Honey-eater's nest. Striking camp at mid-day, we proceeded down stream. We made several attempts to get into a large swamp, into which the water was rushing with great speed. After being nearly capsized once or twice, we had to give it up, but made high land at the far end of the swamp by dark, where we pitched our camp. After breakfast next morning we took a boat, and made out on to the big lignum swamp, which was covered in 12 to 14 feet of water: only the very tops of the highest lignum bushes were showing above the flood waters. We pulled in amongst some fine red gum trees, which evidently marked the bank of a creek. Amongst these trees were many hollow limbs, and all these had been selected by Grey Teal and Black Duck as nesting-places. After examining many nests, and watching the birds coming and going from the holes in the trees, we pulled out into the swamp again. Coot and Moor-Hen were plentiful, and here and there a stately old Musk-Duck would sail away amongst the bushes. In one place where we landed a great number of Native-Hens were running about. The morning was spent searching over the swamp. Several Australian Coots' and Moor-Hens' nests were seen, all containing eggs. Many nests of the Little Grass-Bird came under notice, Bald-Coot feathers neatly roofing them in. Once or twice we saw the nest of the Reed-Warbler. Pulling up to the hollow spout of a gum-tree, and looking in, on the bare wood lay the eggs of the Great Brown Kingfisher, or Laughing Jackass. Returned to the camp for lunch, after which my friend and I made out-back from the river to see what bird-life the mallee contained. The first bird we saw was the Black-breasted Song-Lark, and a nest of this bird was discovered shortly afterwards, placed in a depression in the ground, close to a tussock of grass; it was neatly lined with grass stems and rootlets, and there were three eggs, with the usual beautiful pink mottlings. We met with a flock of Cockatoo-Parrots; great numbers of Shell Parrots had congregated to nest in the mallee. We also saw several Many-coloured Parrots. The Yellow-throated Miner made its presence known by its loud call. We were much surprised to find the Eastern Ground Cuckoo-Shrike, for neither of us expected to find this rather rare bird in that locality; only one specimen was seen. Mallee-Parrots and Grass-Parrots were very numerous. On our return journey we saw several fine Harriers sweeping over the long grass. The sun was sinking when we reached camp. After tea, specimens had to be preserved, and then to bed.

One of the most prominent features of the night sounds during our trip through the flooded country was the frog concerts. The

volume of sound was most remarkable when their millions of little throats were in full swing; they produced a rushing sound resembling a fast railway express dashing along. The frogs were often seen during our excursions into the swamps—large green creatures with brown markings; they plumped into the water at the approach of the boat.

Next morning we left camp early and reached Renmark (where the flood waters had nearly entered the town, and had completely surrounded it) by noon. The following morning we left by motor-car, which only proceeded through the township and then was driven on to an improvised punt and landed on high ground. We had a very pleasant trip into Morgan, through waving spear-grass and mallee scrub, having covered the 70 miles before noon. We boarded the train to Adelaide, reaching the city that evening. So ended an enjoyable and profitable ornithological outing on the flooded River Murray.

The following is a list of the birds observed during the trip, with the writer's remarks and field notes. The writer is indebted to his old friend Dr. A. M. Morgan for notes and measurements of some birds preserved by him during the time we were out together. The measurements of the birds are in millimetres, and taken in the flesh. The nomenclature is that of Gregory M. Mathews, F.R.S.E., F.L.S., &c., in the "List of Australian Birds," 1913. The "Official Check-list" name is given in brackets when such is different.

Dromiceius novæhollandiæ (*Dromaius novæ-hollandiæ*). Emu.—Several of these birds were seen between Morgan and Renmark, and tracks were seen elsewhere. Where there are only one or two now, twenty years ago I have seen scores. There is no doubt the time is only too quickly approaching when these strange birds will have disappeared from the country.

Leipoa ocellata rosinæ (*L. ocellata*). Eastern Mallee-Fowl.—We were told by several station people that a few birds still remain in the district. From all appearances they are almost exterminated.

Austroturnix velox (*Turnix velox*). Eastern Little Quail.—These birds were rather numerous, and were often flushed from the high spear-grass. Specimens taken and compared with birds from further south show the river bird to be much more strongly marked on the head and neck. A female taken at Lake Victoria on 6/10/17 measured—length, 165 mm.; spread of wings, 270 mm. Iris yellowish-white; bill bluish-horn colour; feet pinkish-white.

Geopelia placida tranquilla (*G. tranquilla*). Eastern Ground-Dove.—These birds were not numerous.

Phaps chalcoptera. Bronze-winged Pigeon.—An odd bird or two flushed in the scrub.

Ocyphaps lophotes. Crested Pigeon.—These fine birds were rather numerous in places. A nest containing two fresh eggs was observed in a box tree about 10 feet from the ground; this was at Rufus Creek on 9/10/17. Another nest was found near Renmark on 13/10/17; it was placed in a mallee about 10 feet from the ground, and contained two heavily-incubated eggs.

Hypotaenidia philippensis australis (*H. philippensis*). Eastern Pectoral Rail.—A good number of these birds were seen, both along the edges of the swamps and out in the lignum bushes. There was no sign of nesting.

Microtribonyx ventralis whitei (*Tribonyx ventralis*). Eastern Black-tailed Native-Hen.—Great numbers of these birds were seen in several places running along the shores of the swamps, after the manner of domestic fowls. No signs of nesting were seen.

Gallinula tenebrosa. Black Moor-Hen.—Great numbers were scattered all over the flooded area. The nests, which were composed of lignum shoots, bark, gum twigs, and leaves, were very loosely constructed, and placed in a lignum bush—in most cases just above the water; in one or two seen they were higher, up to 18 inches. The number of eggs varied from eight to three, and the markings also varied. Some were heavily blotched, while in others the markings were small and sparse. One nest, in a lignum bush, 8 inches above the water, measured 10 inches over all, cavity 8 inches, and 3 inches deep. The birds would invariably slip off the nest into the water, swim rapidly for a short distance, and then begin to call in a sharp, discordant note, while picking at the water-weed on either side, and doing everything possible to draw our attention from the nest.

Porphyrio melanotus. Eastern Bald-Coot.—These birds were seen along the edge of the lagoon or backwater near the town of Renmark. We were quite surprised at the few met with elsewhere. Occasionally a pair or an odd bird would be flushed from the floating tops of the lignum bushes. No signs of nesting were observed.

Fulica atra tasmanica (*F. australis*). Eastern Coot.—Great numbers were met with all over the flooded country, and they were nesting freely everywhere. The nest was always floating in the water—in fact, in many cases the eggs were lying in it. The nests were composed of lignum branches (green and dry), gum-tree sticks and leaves, green, long, succulent water-grass bent round into shape, covered in some instances with the little floating Murray River weed, and were always made fast to a submerged lignum branch. The eggs varied in number from nine to four, all being of the usual finely mottled pattern. A floating nest observed on 5/10/17 had a foundation of dry lignum sticks; the nest itself was of green water-weed, pieces of green lignum shoots, green gum leaves, and a piece of bark. Over all it was 12 inches, inside $7\frac{1}{2}$ inches, depth $2\frac{1}{2}$ inches.

Podiceps eristatus christiani (*P. australis*). Australian Tippet Grebe.—Only once did we see a pair of these fine birds. Near the Rufus Creek they sailed majestically past us between the lignum bushes, and out of sight.

Lobibyx novæhollandiæ (*Lobivanellus lobatus*). Spur-winged Plover.—Seen in several localities.

Zonifer tricolor (*Z. pectoralis*). Black-breasted Plover.—These birds were much more numerous than the preceding species.

Elseya melanops (*Ægialitis ruficapilla*). Red-capped Dottrel.—Many of these familiar little birds were seen along the river, swamps, and lake.

Burhinus magnirostris (*Esacus magnirostris*). Eastern Stone-Plover.—They were often heard calling at night. On a low piece of

ground close to the river, almost submerged, and covered in tea-tree (*Melaleuca*), we flushed quite a number of these birds.

Austrotis australis (*Choriotis australis*). Australian Bustard.—Very few were seen.

Threskiornis molucca strictipennis (*Ibis molucca*). White Ibis.—Thinly distributed over the flooded country.

Carphibis spinicollis. Straw-necked Ibis.—Very plentiful in the swamps.

Spatherodia regia (*Platalea regia*). Black-billed Spoonbill.—Numbers of these were met along the river and creeks.

Platibis flavipes. Yellow-billed Spoonbill.—Occasionally seen, but not nearly as plentiful as the preceding species.

Herodias alba syrmatorphorus (*H. syrmatorphorus*). White Egret.—Seen all along the river and creeks; the white plumage showed up in strong contrast against the dark background of trees.

Notophox novæhollandiæ. White-fronted Heron.—Numerous everywhere, nesting at the time of our visit; several brooding birds seen on their nests.

Myola pacifica (*N. pacifica*). White-necked Heron.—These fine birds were also numerous, and it was a common sight to see them wading in the swamp or perched on some dry tree out in the water.

Nycticorax caledonicus. Australian Night-Heron.—Numbers of these birds, in both adult and immature plumage, were roosting in the big gum-trees during the day-time.

Chenopsis atrata. Black Swan.—Large numbers of these birds on Lake Victoria made a pleasing sight. Met with occasionally in the great lignum swamps.

Chenonetta jubata (*Chlamydochen jubata*). Maned Goose or Wood-Duck.—Numbers of these birds were met with perched upon the limbs of trees or feeding along the edge of the swamps. Their strange "konking" call was heard by day and night. Some of these birds at the station at Lake Victoria were very quiet, and came to the garden gate to feed on the green grass. No sign of nesting other than that they were in pairs.

Dendrocygna javanica (*D. arcuata*). Whistling-Duck.—I am sure I saw one of these birds fly past on the river.

Casarca tadornoides. Mountain-Duck.—These fine birds were not numerous along the river or in the swamps, and seemed to prefer large, open lakes.

Anas superciliosa. Black Duck.

Virago gibberifrons (*Nettion gibberifrons*). Grey Teal.—Very numerous, mostly in pairs, nesting in the hollow limbs of trees out in the water. They would fly round, settle in the water a few feet away from the boat, and swim on in front of us for quite a distance.

Spatula rhynchotis. Australian Shoveller.—Very few of these Ducks were seen; the whistling sound when on the wing drew attention to their presence.

Malacorhynchus membranaceus. Pink-eared Duck.—Seldom seen; they were nesting without a doubt, although we did not see a nest.

Oxyura australis (*Erisimatura australis*). Blue-billed Duck.—Only seen upon one occasion, on the river.

Biziura lobata. Musk-Duck.—Scattered over all the flooded area. Several nests were seen, but none contained eggs.

Phalacrocorax carbo novæhollandiæ. Black Cormorant.—A number of these fine birds were seen along the river, but we were unsuccessful in finding their rookery.

Mesocarbo ater (*P. sulcirostris*). Little Black Cormorant.—Frequently seen along the river.

Hypoleucus varius hypoleucus (*P. hypoleucus*). Yellow-faced Cormorant.—Occasionally seen.

Microcarbo melanoleucus (*P. melanoleucus*). Little Pied Cormorant.—This was by far the most numerous bird of the family.

Catoptropelicanus conspicillatus (*Pelecanus conspicillatus*). Eastern Pelican.—They were not very numerous.

Circus assimilis. Spotted Harrier (Swamp-Hawk).—We met with these birds sweeping over the long spear-grass and crops of corn in several localities.

Circus approximans gouldi. Swamp-Hawk. — Seen upon a few occasions.

Urospiza fasciata (*Astur approximans*). Australian Goshawk.—Only seen once.

Uroæetus audax. Wedge-tailed Eagle.—Not many of these birds were seen, and they were very far off. The mistaken idea of these birds doing so much harm to lambs has been the means of killing them off by poison and paying for scalps, which is greatly to be regretted.

Haliastur sphenurus. Whistling Eagle.—Many of these birds were seen, also their nests, in the large gum-trees along the river, but they are not nearly so plentiful as I remember them in the eighties.

Falco hypoleucus. Grey Falcon.—Only one example came under notice.

Ieracidea berigora (*Hieracidea berigora*). Striped Brown Hawk.—Often met with, especially back from the river.

Cerchneis cenchroides. Nankeen Kestrel.—This is a fairly common bird all through the Murray district.

Spiloglaux boobook marmorata (*Ninox boobook*). Boobook Owl.—Heard calling at night; no specimen was taken.

Tyto alba delicatula (*Strix delicatula*). Masked Owl.—This bird's unmistakable screech was heard more than once during the night.

Glossopsitta porphyrocephala. Purple-crowned Lorikeet.—Although there were many gum and box trees in blossom, few of these birds were seen.

Cacatoes galerita (*Cacatua galerita*). White Cockatoo.—Numbers of these birds were seen along the river; they were nesting in the cliffs.

Eolophus roseicapillus (*Cacatua roseicapilla*). Rose-breasted Cockatoo.—These lovely birds are still numerous along the river, but are not in the same numbers as thirty years ago.

Leptolophus auricomis (*Calopsitta novæ-hollandiæ*). Cockatoo-Parrot.—A large party of these birds was seen out back from the river just before reaching Renmark.

Polytelis anthopeplus (*P. melanura*). Black-tailed Parrot.—These charming birds were met both out back and on the river; they seemed to fly a good way back to feed, returning to the big timber on the river to roost at night. Two specimens taken at Lake Victoria, 7/10/17 :—No. 1, ♂—iris brown, outer ring lighter; bill rosy red; legs and feet ashy-grey; length, 440 mm.; spread of wings, 620 mm. No. 2, ♀—length, 360 mm.; spread, 595 mm.; bill pale pink.

Platyercus flaveolus innominatus. Pale-yellow Parrot.—This was one of the most common birds on the river. They procure nearly all their food upon the ground, and were often to be flushed from the grass or blue-bush flats, quite a distance from timber. Two birds secured at Lake Victoria, 3/10/17.—No. 1, ♂—iris brown; bill bluish-white; inside mouth yellowish-white; feet dark ashy-grey; length, 350 mm.; spread of wings, 502 mm. No. 2, ♂—length, 340 mm.; spread, 485 mm. Upon comparison it is found that the Lake Victoria specimens approach most closely the Riverina bird, and this seems to be, in the writer's opinion, some grounds for G. M. Mathews's statement that "the lower Murray bird is paler in coloration."

Barnardius barnardi. Mallee (Ring-necked) Parrot.—This is a numerous bird in the mallee all along the river. Two specimens were taken at Millewa, 11/10/17 :—No. 1, ♂—iris brown; bill, upper mandible almost white, lower dark horn colour; feet ashy-grey; length, 350 mm.; spread of wings, 490 mm. No. 2, ♀—length, 337 mm.; spread, 479 mm. No. 3—length, 360 mm.; spread, 480 mm.; wing, 180 mm.; tail, 205 mm.; tarsus, 22 mm.; bill, 23 mm.

Psephotus hæmatonotus. Red-backed Parrot.—Numbers of these birds were seen during the trip, mostly out back from the river.

Psephotus varius rosinae (*P. multicolor*). Southern Many-coloured Parrot.—All the Murray specimens show a great deal more red on the abdomen in comparison with the North and North-Western birds.

Northiella hæmatogaster xanthorrhoea (*P. xanthorrhoeus*). Yellow-vented Parrot.—Met with in small parties in the sandal-wood country, 10 to 15 miles back from the river. Upon comparing these birds with skins from the north and north-east of Adelaide no variation can be detected. Three specimens secured at Lake Victoria, 6/10/17 :—No. 1, ♀—iris brown; bill bluish-white; feet ashy-grey; length, 309 mm.; spread of wings, 345 mm. No. 2, ♀—length, 400 mm.; spread, 370 mm. No. 3, ♂—length, 400 mm.; spread, 36 mm.

Melopsittacus undulatus. Shell-Parrot or Betcherrygah.—These lovely little birds were in countless thousands, and as we motored through the high spear-grass they rose in such vast flocks that they darkened the air. As they wheeled and turned in their quick flight, the bright colours of their plumage formed a dazzling sight.

Ægotheles cristata. Owlet Nightjar.—Dr. Morgan discovered a nest of these birds in a hollow stump at Lake Victoria station, 7/10/17; it contained two young birds covered in white down.

Dacelo gigas. Great Brown Kingfisher.—Wherever the big gum-trees grew this bird was to be found, and the quaint laughing call echoed through the timber and over the flood-waters morning and night. One nest was observed in the hollow limb of a tree out in the swamp; the eggs were laid on the bare wood.

Cyanalecyon pyrrhopygius (*Halcyon pyrrhopygius*). Red-backed Kingfisher.—Were met with in many places. Along the Murray and at Lake Victoria they were rather numerous. They were nesting in the steep banks of a wash-out. The male bird will sit for hours on a stump or post uttering at frequent intervals his strange call, which sounds like "Chow." One specimen taken at Lake Victoria, 3/10/17, ♀—iris brown; bill black, base of lower mandible white; feet ashy-grey; length, 235 mm.; spread of wings, 355 mm.

Sauropatis sancta (*H. sanctus*). Sacred Kingfisher.—Seen once or twice during the time we were out.

Cosmærops ornatus (*Merops ornatus*). Australian Bee-eater.—These beautiful birds, which, by the way, are often known locally as the "Rainbow-Bird," were just looking out their nesting-sites in the banks of wash-outs at Lake Victoria, but had not at that time completed any of their nesting-tunnels. Two specimens taken at Lake Victoria, 8/10/17:—No. 1, ♂—iris scarlet; bill black; feet grey; length to tip of two central feathers in tail, 267 mm.; to end of tail proper, 225 mm.; spread of wings, 350 mm. No. 2, ♀—length, 235 mm.; spread of wings, 350 mm.

Eurostopodus mystacalis (*E. albugularis*). White-throated Nighthjar.—Only saw one of these birds, just at dusk, on the bank of the river; but their strange call was often heard at night.

Heteroscenes pallidus (*Cuculus pallidus*). Pallid Cuckoo.—A good many of these birds were seen and heard. Two specimens taken at Lake Victoria, 6/10/17:—No. 1, ♀—iris dark grey, with dark brown rim; bill, upper mandible almost black, lower yellowish-brown, black tip; length, 310 mm.; wing, 185 mm.; tail, 180 mm.; bill, 23 mm.; tarsus, 27 mm.; stomach contents, many hairy caterpillars. No. 2, ♂—iris greyish-brown; bill, top mandible blackish-brown, lower mandible olive-brown; inside mouth orange-red; feet brownish-grey; stomach contents, a quantity of hairy caterpillars.

Owenavis osculans (*Mesocalius osculans*). Black-eared Cuckoo.—This bird was not often seen. One specimen taken at Lake Victoria had iris dark brown, bill black, inside mouth black, feet nearly black; length, 203 mm.

Neochalcites basalis mellori (*Chalcococcyx basalis*). Narrow-billed Bronze-Cuckoo.—Only observed once or twice.

Lamprococcyx plagosus (*C. plagosus*). Bronze-Cuckoo.—Seen only once.

Hirundo neoxena. Welcome Swallow.—Observed all along the river, and everywhere out back where there were human habitations.

Cheramæca leucosternum stonei. Eastern Black-and-White Swallow.—These Swallows were seen in several places during the trip.

Hylochelidon nigricans caleyi (*Petrochelidon nigricans*). Tree-Martin.—Quite numerous along the river.

Lagenoplastes ariel (*P. ariel*). Fairy Martin.—Very numerous all over the flooded area, and at Renmark thousands had collected and had attached their strange retort-shaped mud nests under the projecting top of the water-tower in the town.

Micræa fascians. Australian Brown Flycatcher.—Many of these birds were noted, and Dr. Morgan discovered a nest at Lake Victoria 7/10/17, placed in the fork of a horizontal mallee branch, about 3 feet from the ground. It measured—over all, $2\frac{3}{8}$ inches; cavity, $1\frac{7}{8}$ inches; depth, $\frac{5}{8}$ inch. Material, bark, bound with cobwebs and lined with rabbit fur. Contained two slightly incubated eggs.

Whiteornis goodenovii (*Petroica goodenovii*). Southern Red-capped Robin.—One or two birds seen out back from the river.

Melanodryas cucullata vigorsi (*M. bicolor*). Southern Hooded Robin.—A few of these birds noted in the mallee.

Smicronis brevirostris viridescens. Greenish Tree-Tit.—Many of these birds were seen in the tree-tops in many localities.

Gilbertornis rufogularis gilbertii (*Pachycephala rufogularis*). Red-throated Thickhead.—These beautiful songsters were fairly numerous both in the tea-tree scrub on the river flats as well as out back in the scrub. Two specimens taken:—No. 1, ♂—iris rich reddish-brown; bill, black; inside mouth, black; back of palate, bluish colour. No. 2, ♀, Lake Victoria, 6/10/17—iris rich reddish-brown; bill and feet black; length, 205 mm.; spread of wing, 305 mm.

Leucocircæa tricolor (*Rhipidura motacilloides*). Black-and-White Fantail.—This familiar little bird was met in every locality.

Pteropodocys maxima (*P. phasianella*). Eastern Ground Cuckoo-Shrike.—It was a great surprise to meet this bird about a mile or more back from the river, a few miles above Renmark. This was the only time the species came under observation.

Coracina novæhollandiæ melanops (*Graucalus melanops*). Black-faced Cuckoo-Shrike.—Seen in many localities.

Lalage tricolor (*Campephaga humeralis*). White-shouldered Caterpillar-eater.—Seen near Lake Victoria.

Pomatostomus ruficeps (*Pomatorhinus ruficeps*). Chestnut-crowned Babbler.—Observed at Lake Victoria. One specimen taken by Dr. Morgan had iris brown, bill black, feet dark grey, inside mouth dull yellow.

Morganornis superciliosus (*P. superciliosus*). White-browed Babbler.—Seen all over the country visited.

Cinclorhamphus cruralis cantatoris. Southern Brown Song-Lark.—Plentiful all through the country, breeding. Nest observed 13/10/17; three fresh eggs. Depth of nest, 3 inches; opening, $2\frac{1}{2}$ inches; outer part dry grass, lined with green grass and spear-grass heads.

Ptenoedus mathewsi vigorsi (*C. rufescens*). Eastern Rufous Song-Lark.—Seen upon several occasions during the trip.

Epthianura albifrons. White-fronted Chat.—A fairly common bird.

Parepthianura tricolor (*E. tricolor*). Tricoloured Chat.—Numerous in the open timbered country. One bird taken, Lake Victoria, 6/10/17, ♂—iris yellowish-white; bill and feet dark brown; length, 126 mm.; spread of wings, 220 mm.

Aurepethianura aurifrons (*E. aurifrons*). Orange-fronted Chat.—A small party seen in the blue-bush country near Lake Victoria.

Conopoderas australis (*Acrocephalus australis*). Southern Reed-Warbler.—A few examples seen and heard in the swamps. These birds prefer the reeds to lignum bushes. Two or three nests seen. They seemed to have just made a start to nest.

Poodytes gramineus dubius (*Megalurus gramineus*). Southern Grass-Bird.—Great numbers of these birds were nesting in the lignum swamps. They had just started to nest when we arrived at Lake Victoria; before we left many nests were seen. One nest, placed in a lignum bush 3 inches above water, was made of grasses and rabbits' fur, lined with Duck feathers, one Egret's feather, one White-fronted Heron's feather, and a feather of the Yellow Parrot. Height, 3 inches; cavity, 2 inches deep and 2 inches broad. All nests were invariably covered in with Bald-Coots' feathers.

Acanthiza uropygialis. Chestnut-rumped Tit-Warbler.—These little birds were fairly numerous on the high ground at "Millewa," 11/10/17. One specimen taken, ♀—iris white; bill and feet brown; inside bill black; length, 103 mm.; spread of wings, 160 mm.

Geobasilus chrysorrhous (*A. chrysorrhoea*). Yellow-rumped Tit-Warbler.—Seen in many places; a common bird.

Pyrholaemus brunneus. Redthroat.—Not a common bird; seen out from Lake Victoria.

Malurus cyaneus leggei. Southern Blue Wren-Warbler.—Often met with out in the flooded country, living in the tops of the lignum bushes, which were almost submerged. Upon comparison they seem to approach the Victorian bird more than the South Australian form, the blue being darker than in the latter bird. One specimen taken at Rufus Creek on 9/10/17, ♂—iris brown; bill black; feet brown; length, 129 mm.; spread of wings, 152 mm.

Hallornis cyanotus (*M. cyanotus*). White-winged Wren-Warbler.—Met with in the blue-bush country.

Leggeornis assimilis (*M. assimilis*). Purple-backed Wren-Warbler.—We found this species in the same locality as *M. c. leggei*, and they were often seen in close relationship with each other.

Artamus leucorhynchus leucopygialis (*A. leucogaster*). White-rumped Wood-Swallow.—Was met with in many places, but seemed to keep fairly well to the river, lake, and creeks. It was often seen hawking in small parties over the flood-waters. Habits are very like those of other members of the family, but the note is distinctive. One specimen taken at "Millewa," 11/10/17—iris, reddish-brown; bill light blue, tip black; feet mealy-black; length, 180 mm.; spread of wings, 360 mm. In comparison with the Cooper's Creek bird, the Murray bird is darker, is 6 mm. longer, but, strange to say, is 8 mm. shorter in spread of wings.

Campbellornis personatus munna (*A. personatus*). Masked Wood-Swallow.—Vast flocks of these birds, in company with other species of the family, were seen near Lake Victoria; they were feeding on millions of immature grasshoppers.

Campbellornis superciliosus (*A. superciliosus*). White-browed Wood-Swallow.—Seen in great numbers with the preceding species.

Austrartamus melanops (*A. melanops*). Black-faced Wood-Swallow.—Numbers of these birds were seen between Morgan and Renmark. It is my firm opinion that it is only of recent years that this species has come so far south.

Pseudartamus cyanopterus (*A. sordidus*). Wood-Swallow.—This widely-distributed bird was seen in several localities.

Colluricincla harmonica. Grey Shrike-Thrush.—These birds were plentiful all along the river—in fact, all through the big gum country. One specimen taken, 3/10/17, ♀—iris brown; bill slaty-grey; feet mealy-black; length, 240 mm.; spread, 355 mm. Upon comparison with female specimens collected further south, the bird shows a lighter coloration all over, and striations on the throat are much more pronounced.

Grallina cyanoleuca (*G. picata*). Magpie-Lark.—A very common bird all over the river district.

Gymnorhina tibicen. Black-backed Magpie.—These birds covered an area between Morgan and Renmark.

Gymnorhina hypoleuca leuconota (*G. leuconota*). White-backed Magpie.—By far the more numerous of the two species, but they do not seem to overlap.

Cracticus nigrogularis. Black-throated Butcher-Bird.—Seen upon several occasions; not plentiful. Their beautiful clear notes were often heard.

Bulestes torquatus (*C. destructor*). Collared Butcher-Bird.—Often met with on the river, as well as in the scrub further back.

Oreolea cristata. Crested Bell-Bird.—This bird was seen, and its wonderful note heard.

Aphelocephala leucopis. White-face.—Fairly numerous round Lake Victoria. One specimen taken at that place, 6/10/17, ♀—iris white; bill and feet black; length, 110 mm.; spread, 180 mm. This bird approaches somewhat *A. l. whitei*, and is of a much more ruddy coloration when compared with the form found lower down the river, and is smaller.

Neochmia picumna australis (*Climacteris scandens*). Brown Tree-creeper.—These birds were fairly numerous amongst the timber on the river.

Austrodicæum hirundinaceum (*Dicæum hirundinaceum*). Flower-pecker or Mistletoe-Bird.—Only observed once.

Pardalotinus striatus ornatus (*Pardalotus striatus*). Red-tipped Pardalote.—Found all through the district visited. At Lake Victoria they had assembled in numbers, and had made their nesting-tunnels into the bank of a wash-out. The tunnel was 18 inches to 2 feet in, where a small chamber was hollowed out, in which a neat nest of dry grass was formed. Many of these nests had been scratched out by the imported fox. Two specimens taken at Lake Victoria:—No. 1, ♀, immature—iris brown; bill black, inside mouth blackish colour; feet slaty; length, 115 mm.; spread of wings, 200 mm. No. 2, ♂—length, 120 mm.; spread, 205 mm. Upon comparison it is found that the Murray bird is much darker than the northern bird, and the tips of the spurious wing feathers are orange, while those of the Northern bird are crimson,

Melithreptus atricapilla (*M. brevirostris*). Brown-headed Honey-eater.—Seen in the low scrub close to the river. Two specimens taken at "Millewa," 11/10/17 :—No. 1, ♀—iris brown ; bare skin round eye pale yellow ; bill black ; feet brownish-yellow ; length, 150 mm. ; spread of wings, 220 mm. Upon comparison these birds do not differ from specimens from the north-west of the State.

Plectorhyncha lanceolata. Striped Honey-eater.—Observed by Dr. Morgan on the Rufus Creek.

Cissomela nigra ashbyi (*Myzomela nigra*). Black Honey-eater.—Seen in the flowering box-trees at Lake Victoria. One specimen taken, 2/10/17—iris dark brown ; inside mouth flesh colour ; bill black ; feet dark brown.

Meliphaga sonora (*Ptilotis sonora*). Southern Singing Honey-eater.—Seen in almost every situation. Iris brown ; inside mouth yellow ; legs and feet dark grey ; bill black.

Ptilotula penicillata (*Ptilotis penicillata*). White-plumed Honey-eater.—A common bird all through the district. One specimen taken at Lake Victoria, ♂—iris brown ; feet yellowish-brown ; inside mouth orange ; length, 192 mm. ; spread, 240 mm. ; wing, 83 mm. ; bill, 12 mm. ; tarsus, 18 mm. ; tail, 43 mm. Stomach contents, insects and nectar.

Myzantha melanocephala. Black-headed Miner.—A very common and noisy bird all along the river and round the lake, but never seen out back, where *M. flavigula* takes its place.

Myzantha flavigula. Yellow-throated Miner.—As soon as the river belt is left this bird appears ; the preceding species, being much more robust, seems to keep this bird back from the river timber. One bird taken near Lake Victoria, 6/10/17, ♂—iris brown ; bill orange ; feet olive-yellow.

Acanthogenys rufogularis (*Acanthogenys rufigularis*). Spiny-cheeked Honey-eater.—A very common bird. Its strange gurgling note was heard on the river as well as in the scrub far back. Two birds procured :—No. 1, ♂, Lake Victoria—iris brown, with white rim ; bare skin round eye light flesh colour ; base of bill flesh colour, tip black ; inside mouth orange ; feet dark slate ; length, 260 mm. ; wing, 120 mm. ; tail, 120 mm. ; bill, 23 mm. ; tarsus, 29 mm. ; spread of wings, 340 mm. ; stomach contained insect remains and part of small wasp. The rufous coloration on the throat seemed to be much paler in comparison with birds from further north.

Dr. Morgan kindly supplies me with the following notes of a nest he observed near "Chowella" :—Measured $3\frac{1}{2}$ inches in diameter, 2 inches deep ; built of green convolvulus stems, spider webs and cocoons, lined with thistledown, spear-grass seeds, and a piece of sheep's wool ; contained three slightly-incubated eggs.

Entomyzon cyanotis (*Entomyza cyanotis*). Yellow-throated Friar-Bird.—These birds were very numerous round Lake Victoria, and their noisy yet musical note was often heard. They are very pugnacious. Although no nests were seen, I am sure they were breeding by their antics. Three specimens taken at Lake Victoria :—No. 1, iris brown ; bare skin below eye leaden colour ; legs and feet greenish-black ; inside mouth light flesh colour. No. 2, 3/10/17, ♂—length, 285 mm. ; spread, 415 mm. No. 3, 4/10/17, ♂—iris greyish-brown ;

feet greenish-black; space below eye leaden colour; bill black; length, 280 mm.; spread, 400 mm.

Anthus australis. Australian Pipit.—Plentiful wherever there was open country.

Mirafra javanica secunda (*M. secunda*). Lesser Bush-Lark.—Not numerous.

Stagonopleura guttata. Spotted-sided Finch.—Only observed upon one occasion.

Tæniopygia castanotis. Chestnut-eared Finch.—This widely-distributed Finch was observed upon many occasions.

Corvus coronoides. Australian Raven (Crow).—Thinly scattered through the country.

Strepera (sp. ?)—A *Strepera* was seen upon more than one occasion in the mallee, but not close enough to be identified.

Corcorax melanorhamphus. White-winged Cough.—These birds were met with in large parties along the river, and were nesting. Their strange mud nests were seen. One specimen taken at Lake Victoria, 8/10/17, ♂—iris crimson; bill and feet black; inside mouth white; length, 480 mm.; spread of wings, 720 mm.

The Skeleton of the “Kea Parrot” of New Zealand (*Nestor notabilis*).

BY DR. R. W. SHUFELDT, C.M.Z.S., HON. MEMBER R.A.O.U., &c.

DURING the summer of 1917 the Department of Tourist and Health Resorts, New Zealand Government, presented to the National Zoological Park at Washington, D.C., nine adult specimens of the famous “Kea Parrot” (*Nestor notabilis*). When the shipment arrived at the Park, 31st August, 1917, one bird was found dead in the crate, and transferred to the United States National Museum, to be prepared as a skeletal accession to the collection. The tag on the specimen made record of the facts that the bird was a male, its Park number being 2441, and that it was dead on arrival at the station (30th August, 1917).

The National Museum label gives its number as 225,989, and the fact that it was received on the 1st of September, 1917. On the 24th of the same month the skeleton, which had been beautifully prepared by Mr. Scollick, of the Museum, was loaned to the writer for the purpose of preparing an account of its osteology.

Turning to the literature of the group of Parrots to which *Nestor notabilis* belongs, it will be noted that, while some attention has been paid to its morphology, there is really no complete description of its skeleton extant.

Under the generic name, *Nestor*, Alfred Newton, in his “Dictionary of Birds,” says:—“The position of the genus *Nestor* in the Order *Psittaci* must be regarded as uncertain. Garrod removed it altogether from the neighbourhood of the Lories (*Proc. Zool. Society*, 1874, p. 597), to which, indeed, the structure

of its tongue, as previously shown by him (*op. cit.*, 1872, p. 789), indicates only a superficial resemblance. Like so many other New Zealand forms, *Nestor* seems to be isolated, and may fairly be deemed to represent a separate family—*Nestoridae*—a view adopted by Count T. Salvadori ("Cat. Birds Brit. Mus.," xx., introd., p. viii.), and fully justified by a cursory examination of its osteology, though this has hitherto been only imperfectly described and figured (Eyton, "Osteol. Avium," p. 72; A. B. Meyer, "Abbild. von Vogel-Skeletten," p. 18, pl. 23)."

What Eyton sets forth on page 72, vol. i., of his "Osteologia Avium" is of scant value, in so far as it throws any light on the skeletology of this genus; while the work of A. B. Meyer ("Abbild. von Vogel-Skeletten") has, in some manner, been lost from the library of the United States National Museum, and consequently the complete skeleton of the Kea, there said to be figured, has not been seen by me in the present comparison. It is very doubtful that it would be of much assistance.

Garrod gave us a "Note on the Tongue of the Psittacine Genus *Nestor*,"* in which he compared the soft parts of that organ in a number of Parrots, *Nestor hypopolius* being among them. He arrived at this conclusion:—"From these considerations, and a comparison of the accompanying drawings of the tongues of *Stringops*, *Nestor*, and *Trichoglossus*, it is evident that the structure of this organ would lead to the placing of *Nestor* among the typical Parrots, though an aberrant one, and not with the *Trichoglossinae*; and other points in its anatomy favour this conclusion" (Coll. Mem., p. 116).

Garrod does not appear to have studied the osseous portion of the tongue in *Nestor*; had he done so, he would have discovered how markedly that structure differs from the corresponding parts in *Stringops* and many other Parrots.

This author also studied the *carotids* of *Nestor notabilis* (Coll. Mem., p. 170), as well as certain muscles of the thigh (*loc. cit.*, p. 195). In three other very famous papers of his he went very thoroughly into these matters, taking other structures up in connection with them (*loc. cit.*, pp. 247-263). Garrod does not appear to have paid much, if any, attention to the skeleton of *Nestor* in any of his writings. With respect to taxonomy, he relegated the PSITTACI to a sub-order. In this sub-order, the *Psittacidae* appears as Family II., which includes Sub-family (4) *Arinae*—*Nestor* appearing last after the genus *Paeocephalus*.

Forbes paid but scant attention to the anatomy of *Nestor*. In reviewing Dr. Hans Gadow's paper in the *Jenaische Zeitschrift* †—a very thorough paper on the anatomy of the avian organs of digestion—he says:—"No allusion is made to the tongue of

* Proc. Zool. Soc., 1872, pp. 787-789, five figs.

† "Versuch einer verglichen Anatomie des Verdauungssystems der Vögel"—(1) Theil, *Jen. Zeitschr. f. Wissenschaft*, Band xiii., Heft 1, pp. 92-171 (1879); (2) Theil, *tom. cit.*, Heft 3, p. 339, &c. (1879).

Nestor; and the old statement as to the universal absence of a gall-bladder, or, at all events, its only exceptional presence as an individual variety, in the Parrots and Pigeons, are repeated" (Coll. Sci. Mem., pp. 163, 164). Later on he wrote a paper "On the late Prof. Garrod's Contributions to Bird Anatomy and Classification," in which he simply pointed out what Garrod had done with *Nestor* (*Ibis*, 1881, pp. 1-32, also Coll. Sci. Mem., pp. 189-213).

Sharpe, in his "Hand-list of Birds," vol. ii., p. 1, gives the following classification:—

ORDER XXIII.—PSITTACIFORMES.

Family I.—*Nestoridæ*.

(Cf. Salvad. "Cat. B. Brit. Mus.," xx., p. 4, 1891.)

with four existing species of *Nestor* contained in it, and two extinct ones.

In his "Classification of Birds" further divisions are suggested, thus:—

ORDER XXIX.—PSITTACIFORMES.

SUB-ORDER LXXII.—PSITTACI.

Family 1.—*Nestoridæ*.

„ 2.—*Cyclopsittacidæ*.

„ 4.—*Cacatuidæ*.

„ 5.—*Psittacidæ*.

„ 6.—*Stringopidæ*.

And of this he says:—"The following order of Families has been kindly supplied to me by my friend Count Salvadori. He proposes it in his forthcoming volume of the British Museum 'Catalogue of Birds.'"

In the "Catalogue of the Specimens Illustrating the Osteology of Vertebrated Animals, Recent and Extinct, Contained in the Museum of the Royal College of Surgeons of England, Part III.—Class Aves," by R. Bowdler Sharpe, LL.D., London, 1891, it is to be noted that *Nestor* is represented on page 239. (Wagler, "Abhandl. Ak. Wissensch. München," i., p. 503, 1829-30.) In that museum there was, at the time the "Catalogue" appeared, the upper mandible and a skeleton of the Ka Ka Parrot (*Nestor hypopolius*) (Gould, "Handb. B. Austr.," ii., p. 548, 1865), and a skull as well as a mounted skeleton of the Mountain Ka Ka (*Nestor notabilis*).*

I have looked up the paper, which is in German, by Dr. Ludwig

* *Nestor notabilis*, Gould, P.Z.S., 1856, p. 94; *id.*, "Handb. B. Austr.," ii., p. 544, 1865; Buller, "B. New Zealand" (second ed.), vol. i., p. 166 (1888); A. B. Meyer, "Abbild. Vogel-Skelet.," Taf. xxiii. (*N. meridionalis*); Lorenz, Sitz. K. Akad. Wiss., Wien, lxxxiv., Abth. i., p. 624. There is a brief but very good popular account of the Keas in "The Living Animals of the World," vol. ii., p. 487, Lond. It is illustrated by three figures of Keas, one of which is an excellent reproduction of a photograph from life by W. Reid.

von Lorenz; it is entitled "Über die Skelete von *Stringops habroptilus* und *Nestor notabilis*."*

Dr. Frank E. Beddard, F.R.S., in his excellent work on "The Structure and Classification of Birds," London, 1898, devotes some little attention to *Nestor*.† He points out that the *furcula* is complete in that Parrot. He gives the number of vertebrae that occur in its spinal column, and he comments on the fact that Gadow practically divided the Parrots into two families, according to the structure of their tongues—viz., the *Trichoglossidæ* and *Psittacidæ*. "In all the *Trichoglossidæ* the orbital ring is incomplete, and it is possible that the remarkable structure of the hyoid, described above, may serve to distinguish this family. The first family contains only *Nestor*, the Lories, *Cyclopsittacus*, and *Lathamus*; but the two latter are very imperfectly known. The remaining genera are relegated to the second family" (p. 267). Beddard, in his sub-order *Psittaci*, arrays two families, the second one of which is the *Psittacidæ*. In this family the sub-family *Arinæ* is created to contain *Ara*, *Connurus*, *Bolborhynchus*, *Caica*, *Psittacus*, *Paecephalus*, and *Nestor*. In all these groups the left carotid is superficial, and the ambiens muscle is present. He adds, on page 271:—"Mr. Parsons and I have pointed out certain likenesses between *Stringops*, the *Cacatuinæ* of Garrod, and *Nestor*, which he places in an altogether different family."

The study of such fossil Parrots as have been discovered up to date does not throw much light upon the taxonomy of the existing ones.

ON THE SKELETON OF NESTOR NOTABILIS.

(Plates IV.-X., figs. 1-16.)

During past years I have published several papers on the osteology of the *Psittacidæ*, and these will be referred to during the present investigation of the skeleton of *Nestor*.‡

* Vorgelegt in der Sitzung am 15 December, 1881; Aus dem lxxxiv. Band der Sitzh. der K. Akad. der Wissensch., 1 Abth., December-Heft., Jah., 1881, pp. 1-9. It is illustrated by three plates (Taf. i.-iii.), two being devoted to some bones of *Stringops* and the third to *Nestor notabilis*. This latter presents three views of the skull of *Nestor notabilis*, also a dorsal view of the articular end of the mandible. They are lithographs, but apparently fairly accurate.

† See also Blanchard, "Des Caractères Ostéologiques Chez les Oiseaux de la Famille des Psittacides," *Compt. Rend.*, xliii., p. 1,097, and xlix., p. 518; Milne-Edwards, "Observations sur les Caractères Ostéologiques, &c.," *Ann. Sci. Nat.* (6), vi., p. 91.

‡ Shufeldt, R. W., "Osteology of *Connurus carolinensis*," *Jour. Anat. and Phys.*, Edinburgh, April, 1886, vol. xx., pp. 407-425, plates x. and xi., figs. 1-18. Shufeldt, R. W., "Osteology of the *Psittaci*," *Ann. Carnegie Museum*, vol. i., pp. 399-421, plates xxi.-xxiv., 1902. Shufeldt, R. W., "An Arrangement of the Families and the Higher Groups of Birds," *The Amer. Nat.*, vol. xxxviii., Nos. 455-456, Nov.-Dec., 1904, pp. 833-857, Boston, 1904, illus.; in this arrangement the *Nestoridæ* (Psittaciformes: Sub-order xxiii., Sub-order xxxiv., *Psittaci*, Super-family I., *Psittacoidæ*,



The Skull.—While the main morphological characters of the cranium in the *Psittaci* are very similar, yet, when we come to compare this part of the skeleton of the "Kea" with the cranium of a Macaw, of a true Parrot, a *Lorius*, or the like, it is by no means difficult to select a character here or a character there which may not only be different, but very distinctive.

Viewing the cranium of *Nestor* from above, it is to be noted that it possesses the broad, smooth, and rounded surface seen in the crania of the *Psittacidae* generally.* It is, however, longer than it is broad, being inclined to be narrow between the orbits, with the parietal prominences diffuse though well pronounced. These latter are practically absent in *Amazona*, and circumscribed in the larger Macaws. The superior margins of the orbits are sharp, as is the rule in Parrots generally; while within their edges posteriorly we find a row of minute foramina for the transmission of vessels (and nerves?) to the skin of the top of the head.

Anteriorly, the *cranio-facial hinge* is quite as functional as we find it in any other species of the group—indeed, more so than in such a form as *Ara severa*, and, perhaps, other Macaws. This "cranio-facial hinge" very distinctly defines the supero-posterior limitation of the upper mandible in any member of this Order of bird; in fact, in the dried skull of any Parrot of the family *Psittacidae* one can readily break the upper beak off from the cranium simply by taking it by its forepart and forcing it backward in the direction of the top of the cranium. The palatines, and maybe the pterygoids, will come away with it. (See figs. 1, 3, and 7 in Plates IV., V., and VI.)

In *Nestor* the *superior mandible* is much elongated; narrow from above downwards, being gently decurved from base to apex, and drawn out into a sharp, transversely narrow point. Its osseous tomia are cultrate; the anterior two-thirds of its ventral surface (osseous roof of the mouth) being smooth and flat posteriorly, and somewhat concave anteriorly. Its posterior margin is carried somewhat backwards mesially, which, in the Macaws and many Parrots, is a straight, transverse line. Posterior to this, the anterior ends of the *palatines* pass forwards and upwards into the rhinal chamber (fig. 3, Plate V.)

For a *Psittacine* bird, the nasal apertures are unusually large. In either one of them the outline is elliptical, while the circular aperture is at the posterior base of the concavity (fig. 1, Plate IV.) The maxillo-nasal suture is persistent.

family *Nestoridae*), is placed as the leading family of the group next before the *Loriidae*. Shufeldt, R. W., "Osteology of the *Palæornis*, with Other Notes on the Genus," *Trans. of the Royal Society of South Africa*, vol. v., part 5, June, 1916, pp. 575-591, plates xxxix.-xli.; plate xxxix. is a coloured figure of the bird.

* When *Nestor* is mentioned in the present contribution, it is to be understood that *Nestor notabilis* is the species invariably referred to. I regret to say that I have, at this time, the skeletons of no other representatives of that genus before me for comparison.

Passing to the lateral aspect of the cranium, its features are well shown in fig. 1 of Plate IV. of the present paper. It will at first be observed that the "osseous ring," which completely surrounds the orbit in so many species of Parrots, Macaws, and the rest, is here incomplete posteriorly, while the post-frontal process is very much aborted.

The "zygoma" is of a very uniform calibre, with its extremities but slightly enlarged. Viewing it laterally, it appears to be straight; but seen from above it presents a strong sigmoid curve, extending from one end to the other. (Compare figs. 1 and 3 of the plates.)

The osseous auricular meatus is completely shielded by the surrounding bones of the cranium. A sphenotic concavity exists in front of it, triangular in outline, with elevated margins above and below—the latter overlapping the facet for the head of the quadrate (fig. 1).

Eminences, depressions, crests, and ridges, so conspicuous at the sides and back of the cranium in so many other species of birds of diverse groups, are, in this New Zealand Kea, all practically suppressed; so that, upon the external aspect of all this latero-posterior part of the brain-case, the rounded surface is quite devoid of any conspicuous elevations whatever, which is the reverse of what we meet with in the skulls of the larger Macaw species.

Posteriorly, the *foramen magnum* is of good size and sub-circular in outline, the rather prominent condyle having a marked concavity anterior to its site.

The basitemporal area is distinctly triangular in outline, with its general surface concaved, and its lateral margins raised, being withal thin and sharp. These latter are produced out to the ends of the temporal wings of the exoccipitals. Above the foramen magnum, the occipital area is flat, and the occipital crest indicated only by a feeble line on the smooth surface of the bone. This also applies to either crotaphyte fossa, which latter is well shown in fig. 1 of Plate IV.

Within either capacious orbit, the foramen rotundum is circular and thoroughly circumscribed by bone; the large foraminal opening above it merges with the corresponding one of the other orbit, the two together robbing the anterior wall of the brain-case of a large part of its osseous partition.

The mesial ethmoidal mass is markedly extensive and spreading, forming a broad base for the frontal roof above. Its anterior edge forms the posterior line of the cranio-facial hinge in front of it. Laterally and mesially, the body of the *lacrymal*, the *pars plana*, and the mesethmoid are so thoroughly fused together that all sutural lines of demarcation have been entirely obliterated in this adult skull. Mesially, the mesethmoid is raised into a sharpened crest, which is extended posteriorly over the sphenoidal rostrum to the mid-anterior angular projection of the basitemporal area.



Fig. 3.



Fig. 4.



Fig. 5.

The *sclerotal plates* of the eyeballs that belonged to this specimen have apparently been lost, so I am unable to describe them.

Posteriorly, the "rhinal chamber" is largely filled by bone, it being co-ossified with the internal lateral and superior walls. Inferomesially, it develops a sharp spine, which projects anteriorly into the forepart of the chamber. The narial apertures are sub-circular in outline, and open internally, side by side, just opposite the inferior line of the cranio-facial hinge.

As in the majority of Parrots, the *palatines* are big, strong bones. Anteriorly, they are more or less rod-like, being at first transversely flattened, to become compressed in the opposite direction at their distal terminations. Posteriorly, either bone is an extensive blade—broad, and with rounded margins. When articulated, this portion is directed downwards and backwards, curling inwards above, to articulate with the fellow of the opposite side. This takes place beyond the anterior free edge of the sharp, sphenoidal rostrum. Immediately posterior to this interpalatine articulation there is to be seen the anterior extremities of the pterygoids. They, too, articulate with each other, and each with the palatine of its own side (fig. 3, Plate V.)

Slightly above the middle of the posterior margin of either palatine, we find a delicate little spine some five millimeters in length, which projects directly backwards and slightly downwards. It is well shown in figs. 1 and 3, and constitutes a character, in so far as my observation goes, not found in the cranium of any other species of Parrot.

A *pterygoid* is a very straight little rod, of nearly uniform calibre, and about two centimeters in length. Its extremities are but slightly enlarged to accommodate the articulate facet—a cup-like one posteriorly for the quadrate, and a more or less flat one anteriorly for the palatine and the pterygoid of the opposite side. Very probably, in life, the four bones named have a sliding motion on the sphenoidal rostrum, as the superior mandible moves up and down through the use of the cranio-facial hinge.

In form, either *quadrate* is typically Psittacine, being very much compressed transversely, including the smooth, antero-posteriorly convex facet for articulation of the mandible. Its "orbital process" is short and spine-like, while the stouter "mastoidal" one supports a distinctly divided double head at its superior end for articulation with the twin concavity just anterior to the opening to the middle ear. By studying one of these quadrates in figs. 1 and 3 of the plates, a very good idea of its morphology may be gained. The mastoidal twin heads at the superior end of the bone are placed side by side transversely; so that when the rocking motion comes into play when the superior mandible is in use, the requisite amount of mobility is extended to them. All the usual vascular and nervous foramina to be found in front of the *basis cranii* in the skulls of the *Psittacidae* generally are in evidence here, no one of them being shielded in any way by

projecting osseous lip or otherwise, as they are in the crania of some members of the class.

The Mandible (figs. 1, 4, and 12).—This element of the skull in *Nestor* has more the appearance of the jaw of some kind of Hawk or other than of any ordinary member of the *Psittacoidea*. It is typically V-shaped in form, and entirely lacking in the in-turned apophyses at the mesial sides of the articular ends of the bone. They are aborted to their bases, and it is here that we note the usual pneumatic foramen, upon either side, that admits the air to this part of the jaw.

The articular ends of this jaw are very elongate antero-posteriorly. In the case of either one, the outer side of the concavity is continuous with the mandibular ramus, with its upper border convex from before, backwards, and rounded transversely. The mesial margin is but feebly developed, the whole end being concave superiorly, and carried far behind the true articulation for the quadrate, which latter is rather a short facet situated above the aforesaid concavity, and is, for its entire length, concaved transversely. These characters are all well shown in the figures on the plates. Either ramus between the articular end and the symphysis is broad and deep, being pierced near its middle by a large, elliptical splenial vacuity, with its major axis placed longitudinally. The ramal borders are rounded, the inferior one being considerably thickened.

Most Psittacine birds possess a deep and broad symphyseal part to the mandible, and we find no exception to this here. It is broadly concave behind, the concavity being directed forwards. Superiorly it is markedly concaved from side to side, and correspondingly convex on its ventral aspect. Anteriorly this jaw is truncate at an angle of about 45 degrees with the longitudinal axis of the bone. The margin thus created is extremely thin and sharp. Judging from its appearance and the presence of numerous foramina, the bone seems to be highly pneumatic throughout, as is, indeed, the entire cranium of this remarkable representative of the Parrot tribe.

The Hyoid Arches (fig. 10, Plate VI.)—This part of the skeleton has received considerable attention at the hands of not a few ornithologists. Some of this literature is cited in Beddard's excellent work, "On the Structure and Classification of Birds," where he reproduces for us many of Mivart's figures of the bony parts of the tongues of Parrots (pp. 265-267).

Nestor appears to have the morphology of the various bones to some extent in agreement with what we find in such a species as *Lorius flavopalliatu*s. There is one very unusual departure, however, for the Kea has an entoglossum quite different from that of any other Parrot. The twin moieties are very elongate and drawn close together, which is not surprising, inasmuch as the face of the Kea is more extended anteriorly, and the mandibles narrower, than is at all usual among the *Psittaci*.

The *basihyal* is elongate, being about twice as broad posteriorly



as at its anterior end, where an enlargement exists bearing an articular surface distally, with a minute underlapping lip for articulation with the united entoglossum. Posteriorly it is produced mesiad as the *urohyal*—a very slender rodlet about five millimeters in length.

At the middle of the *basihyal*, dorsad, there is to be observed a scroll-like, osseous *parahyal process*, which practically agrees with what we find in the skeleton of the tongue in some of the Lories, as, for example, *Lorius flavopalliatatus*, as figured by Mivart and republished by Beddard (*loc. cit.*, p. 266). The parahyal process upon either side is produced forwards on the dorsal aspect of the basihyal as an elevated, thin, osseous plate, to meet the fellow of the opposite side anteriorly, and co-ossify with it. At this point it is a thin, sharp, bony platelet, directed to the front, standing well above the basihyal and not in contact with it.

The *hypobranchials* are long and slender, while the *ceratobranchials*—still more slender and more lengthy than in the *Psittaci* generally—do not seem to be terminated posteriorly in cartilaginous tips or free ends.

In regard to the osseous hyoid arches, Beddard remarks that “the only bird which seems to present much resemblance to the Parrots is the Eagle, which, according to the figure in Bronn’s ‘Thierreich,’* has a broad basihyal with the short angular processes which suggest the more elaborate parahyals of the Parrots.”†

Probably, were a more extensive comparison made than there has heretofore been of the hyoids of the *Psittaci* with those of the *Raptores*, not a few resemblances would be brought to light, in so far as these two groups of birds are concerned.

With respect to the *trachea*, only a very small part of it was preserved by the osteologist that prepared this skeleton. It consists of the upper three tracheal rings, which are completely ossified, and the *larynx* (fig. 11, Plate VI.), all the dorsal portions and structures of which are in membranous cartilage, while the solid “thyroid plate” is in bone. To gain much information, however, about the upper part of the trachea in any bird, the anatomy of it should be studied with the aid of good alcoholic specimens, or upon birds recently killed. There is large room for extensive work in such directions, and it is very humiliating to think how little we really know of the subject.

The Vertebral Column (figs. 8 and 9, Plate VI.; fig. 13, Plate VII.; fig. 14, Plate VIII.; and fig. 15, Plate IX.)—All the prepelvic vertebræ in the spine of *Nestor* are inclined to be strong and massive; they interlock closely by thick and strong processes. The pelvic and coccygeal vertebræ take on pretty much the same character, all of which may be appreciated through a study of the figures on the plates.

* *Aves*, plate xxxi., fig. 23.

† *Loc. cit.*, pp. 266, 267.

The first eleven vertebræ of the neck or *cervicals* bear no ribs at all; on the *twelfth* there occurs a small pair that have but the head and neck, the body being lacking entirely, and they are freely articulated in the usual manner. Passing to the *thirteenth* vertebra, it is to be noted that the pair of ribs are far better developed than on the twelfth; each has a length of about two centimeters, but they do not support *epipleural appendages*, nor do they, upon either side, meet with costal ribs below. In the case of the *fourteenth* or last *cervical vertebra*, its pair of ribs are completely developed as *cervical ribs*, for their articulations with the vertebra are perfect, while the ribs themselves possess small epipleural spines, which anchylose each with the border of its rib, just as do those in the dorsal series following them.

Twelfth cervical vertebra possesses a neural spine closely resembling those found on the dorsals, its height being about the same, while longitudinally it is not so wide antero-posteriorly. These neural spines on the thirteenth and fourteenth cervicals are essentially like the corresponding ones in the dorsal series (Plate VII., fig. 13).

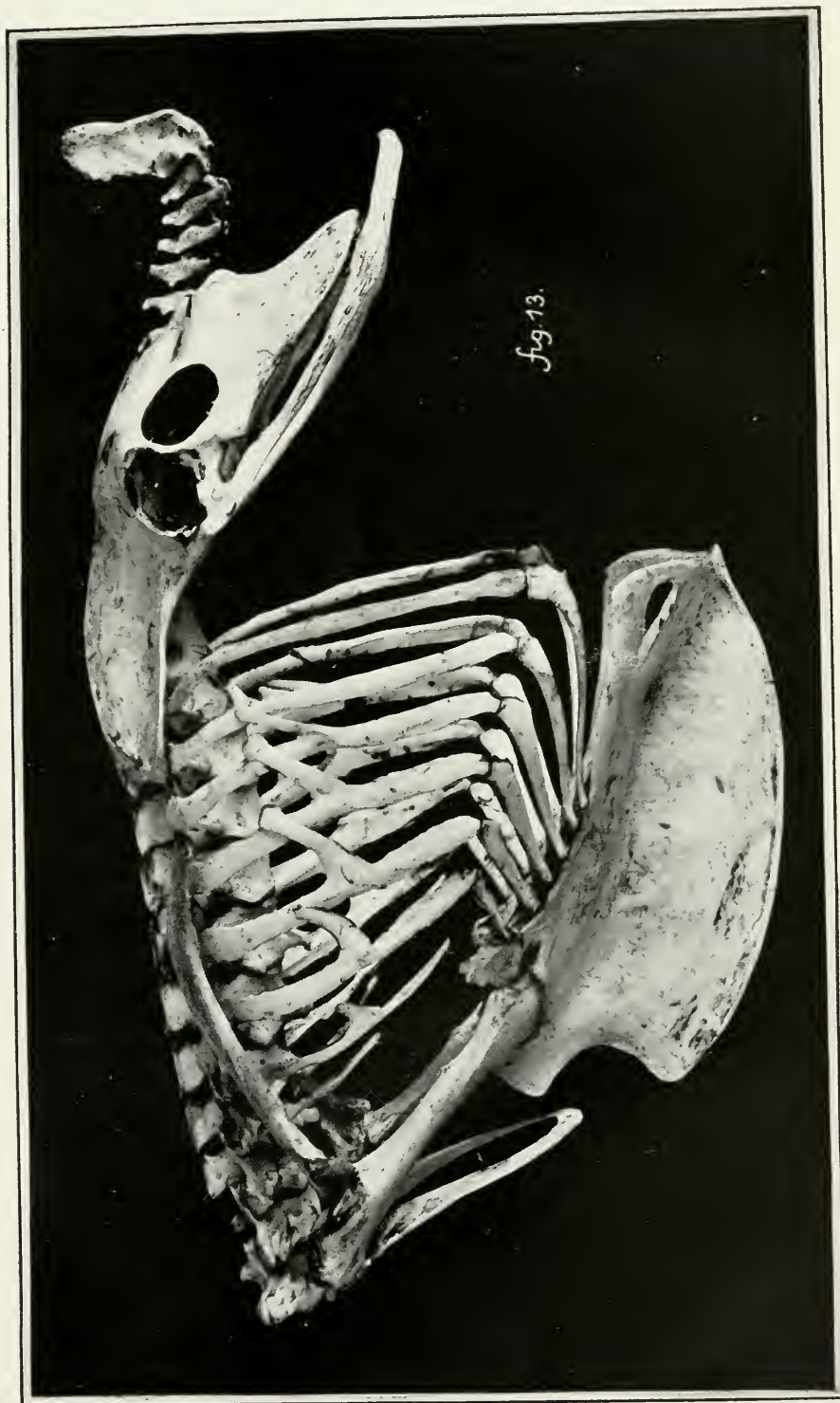
The *atlas* has its cup perforated, and to such an extent that a minute median deficiency occurs in its superior periphery. Its *hyperapophyses* are extremely small, while its big, shield-shaped hæmapophysis is mesially keeled, the whole being produced backwards beyond all the rest of the bone.

The vertebral artery passes the centra of both the axis and the atlas on the way into the cranium, while in the third vertebra, and throughout the rest of the cervical series, it is, upon either side, extensively shielded by bone formed by the lateral processes of any particular vertebra as it passes it. Near the end of the cervical series, one or two of the rudimentary pleurapophyses, on either side, perform a similar service.

Third, fourth, and fifth cervicals possess bluntly-pointed and lofty neural spines, the third and fourth also having well-developed hæmal spines, the one on the fifth being aborted. On the sixth cervical the neural spine is extremely small, and it lacks a hæmal one entirely. No neural spines occur on the seventh, eighth, or ninth, and they are small on the tenth and eleventh. Apparently the carotid arteries passed through the hæmapophysis of the ninth vertebra, while it is an open canal in the sixth, seventh, and eighth. In the fifth and sixth cervicals the post-zygapophyses are elongate and spreading; they gradually shorten after that, and in the last cervical they agree with what is to be found in the dorsal series. Second, third, and fourth cervicals have the pre- and post-zygapophyses very much shortened up, so that, when articulated, these elements of the spine are more extensively in touch among each other.

There is a good-sized *neural canal* throughout the spine in the Parrot, it being of a somewhat larger calibre in the cervical series than it is in the dorsal.

Passing to the *dorsal vertebræ*, we find their big, quadrilateral



neural spines intimately articulated throughout the series; indeed, in the case of the first and second dorsal vertebræ no opening occurs between them. Only the first and second dorsals possess rather short hæmal spines, the ultimate one being slightly bifid. These characters, as seen upon dorsal aspect, are well shown in fig. 15 of the present contribution, especially the broad transverse processes, which, on either side, supports a single, backward-projecting metapophysis.

All the vertebræ of the spinal column, with the possible exception of the last few caudals and the pygostyle, are thoroughly pneumatic; this also applies to both the thoracic and the costal ribs.

Nestor has its *ribs* very perfectly developed, the entire series being, as a whole, a most efficient protection to the contained organs and structures of the thorax and anterior abdominal cavity.

There are four pairs of *dorsal* ribs and two pairs of *pelvic* ones; they all connect with the sternum by the intervention of costal ribs, their modes of articulation being as they occur in all ordinary birds (figs. 13, 14, and 15 of the plates).

Large *epipleural appendages* occur on the first four pairs of these dorsal thoracic ribs; and, upon either side, each overlaps the next rib following it. Curiously enough, on the last thoracic rib of the left side, there are *two* small epipleural appendages, the smaller one of the pair being the lowermost one (fig. 13). There are no epipleural appendages on the corresponding rib of the right side. No case similar to this has ever been seen by me in any bird, in so far as I can remember at the present time.

As we pass from before, backwards, the distal ends of the sternal ribs become more and more expanded. It is hardly noticeable in the first pair, but a decided feature of the ultimate pair. On the right side this latter bone has a short, very narrow, supernumerary sternal rib articulated with its distal posterior margin. Such vestigial osseous structures are interesting, and may point to the fact that the early ancestors of *Nestor* possessed more ribs than this existing form of the species. This *supernumerary costal rib* is well shown in fig. 14 of Plate VIII.—in fact, close inspection of figs. 13 and 15 will likewise reveal both of these anomalies.

The ultimate two pairs of *thoracic ribs* of *Nestor* articulate with the pelvis, and so are *pelvic ribs*; they are not followed by any rudimentary ones more posteriorly, as so often happens among birds of other families.

Other Parrots have two pairs of *pelvic ribs*, as, for example, *Amazona leucocephala* and its near allies.

Nestor has five free *caudal vertebræ* in its tail skeleton. Morphologically, they are very much alike, while they vary but little in the matter of size. Each has a stumpy, blunt neural spine and the last two hæmal spines, the one in the fourth being very rudimentary, while the ultimate one is much better developed and anteriorly bifid. All these vertebræ have stout diapophyses that are directed downwards and outwards (figs. 13, 14, and 15).

There is a large, quadrilateral *pygostyle* terminating the spinal column of *Nestor*; its anterior and superior borders are sharp, while the remaining two are thick and rounded. At the angle of their intersection a special thickish enlargement occurs, which is flat and smooth upon its posterior aspect. Just anterior to this, upon either side, a small foramen is to be seen, the general surface upon this aspect of the bone being smooth and quite flat, apart from the slight elevation extending backwards and upwards from the articulation at the antero-inferior angle.

The Pelvis.—While not typically Psittacine in its morphology, the *pelvis* of *Nestor* does not depart so very widely, in the matter of its form, from that bone as it occurs in Parrots belonging to other genera, as, for example, species of the genus *Amazona*, as well as some of the larger Macaws.

Viewing the bone from above, it is to be noted that the anterior border is at right angles to the longitudinal axis of the spinal column. At the middle point the projecting neural spine articulates in the usual way with the neural spine of the last dorsal vertebra. A slightly raised emargination finishes off the border, being interrupted mesially by the neural spine of the leading vertebra.

For their middle thirds, the *ilia* meet in the middle line, and apparently fuse together. As a matter of fact, these bones completely close over the ilio-neural canals, so that no part of them remains open in the adult—anteriorly, mesially, or posteriorly.

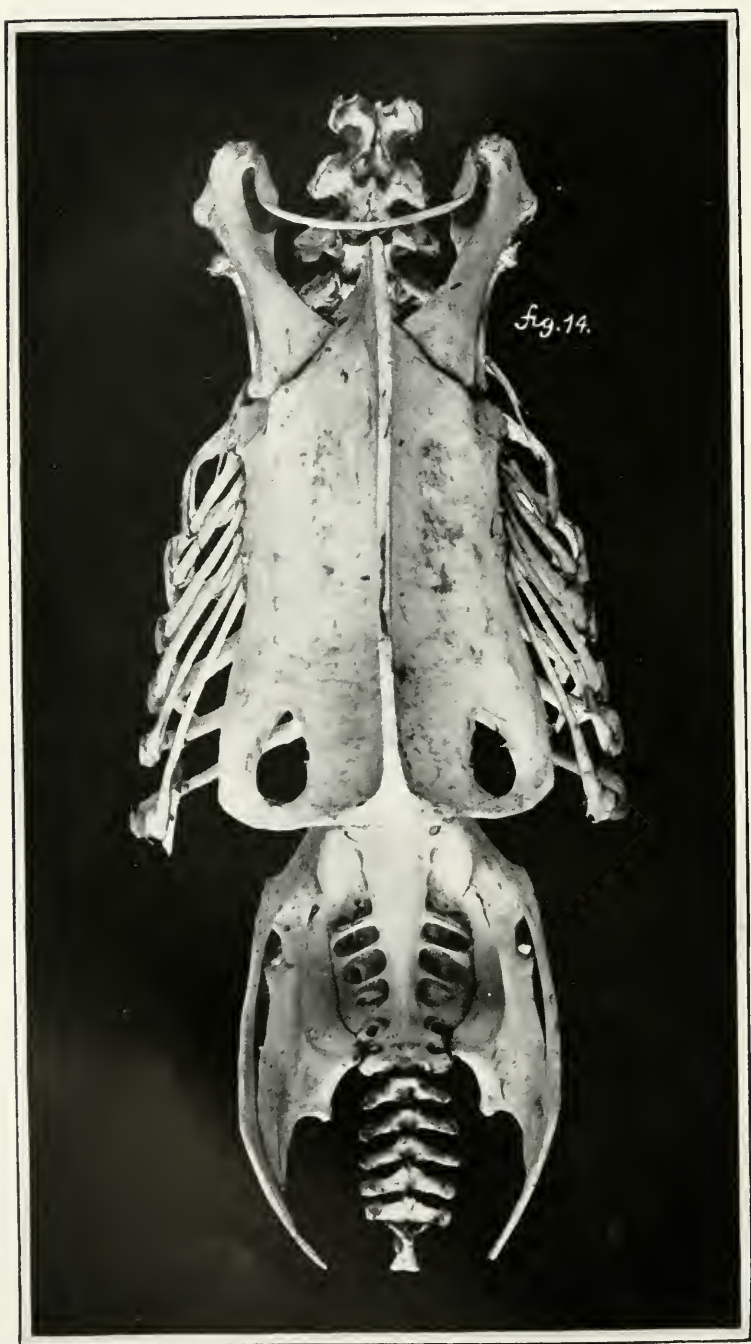
Either ilium—that is, its preacetabular portion—is much concaved externally, the surface looking upwards and outwards; while posteriorly this surface is carried over the top of the acetabulum (figs. 13 and 14).

In the postacetabular area the neural spines of the vertebræ are completely fused together, forming a raised median ridge for the entire length of this part of the bone. The lateral processes of the vertebræ are fused together, leaving but few inconspicuous foramina among them; it is only the last two pairs of the latter that are large and elliptical in outline. Laterally, on either side, the general surface of this postacetabular area is smooth and generally convex.

On the lateral aspect, the *cotyloid ring* for the head of the femur is large and circular in outline. Its base is entirely absorbed, while the triangular antitrochanter is rather small for a bird of the size of *Nestor*, its surface facing almost directly forwards and very slightly downwards. Immediately posterior to it there is a large, elliptical ischiadic foramen, its major axis being parallel to the postpubic style. All the postero-lateral surface of the pelvis is smooth, and withal very much concaved.

The elliptical obturator foramen merges largely into the "obturator space," the latter running the entire length between the pubic style and the lower border of the ischium.

The posterior moiety of the *pubis* is somewhat broader and stouter than the anterior, while it curves mesiad toward the



fellow of the opposite side. Either one projects posteriorly beyond the ischium of the same side for at least a centimeter; both margins of this bone are rounded. There is the barest suggestion of a *prepubis* at the usual site on either side, and it is most evident in fig. 15; it is so minute, however, as to be hardly worthy of mention.

The leading *pelvic vertebra* has its body much individualized, while superiorly it fuses with the under surface of the ilia. The pair of ribs it supports appear to be freely articulated; but this is not the case with the second pair. There are six of the leading pelvic vertebræ that develop lateral processes, which are thrown out to the ventral surface of the ilium upon either side, there to solidly co-ossify.

Opposite the narrowest portion of the preacetabular moiety of the pelvis, the "sacrum" is very broad, and to some degree compressed. From this locality, however, it gradually narrows as we proceed towards the caudal extremity. In the forepart of the pelvic basin, opposite the acetabulæ, the vertebræ fail to throw out any diapophysial braces to the inner margin of the ilium upon either side; while this is a conspicuous feature of the remaining part of the sacrum—that is, of the ultimate six pre-caudal vertebræ (fig. 14, Plate VIII.)

There appear to be fourteen vertebræ in the consolidated "sacrum" of *Nestor*, and this agrees with a number of other species of the *Psittaci*.

Among other points it must be noted that the posterior free border of either ischium is sharp and convex to the front; the ilia behind form, by their borders, a rounded concavity, and into it extends the forepart of the skeleton of the tail, almost to the distance of two leading caudal vertebræ. The "ilio-ischiadic notch" is very shallow, and the ischia behind barely come in contact with the pubis upon either side.

At the inner lower arc of either acetabulum there is an elevation which is very noticeable upon the ventral aspect of this pelvis, as it is in some other representatives of this most interesting assemblage of birds.

The Shoulder Girdle.—*Nestor* is one of those Parrots that has its *os furculum* complete. In form it is a perfect U, its lower half being much flattened from before backward; it is of a uniform width, with a total absence of anything approaching a hypocleidium. Either free extremity is enlarged and flattened transversely, its superior border being rounded off. It articulates with both scapula and coracoid, thus completing the "foramen triosseum." Passing from either free extremity to the arch below, the mesial surface above gradually comes to face anteriorly, the loop below being entirely so directed. The opposite side of the bone reverses this; for where the free end of the arch presses against the coracoid of the same side, its surface is directed outwards. So, in passing to the arch below, this surface gradually comes to face backwards (figs. 13 and 14).

A *coracoid* is a long, stout bone, with all its usual ornithic characters developed. When the girdle is articulated, as in life, the head of a coracoid is considerably above the clavicle of the same side—considerably more so with respect to the anterior extremity of the scapula. This head or superior extremity of the bone is notably enlarged and turned toward the median plane. It gradually merges below into the shaft, which latter is stout, straight, and somewhat compressed from before, backwards. This compression gradually merges into the expanded sternal end of the bone. The outer angle of the latter is broadly truncate, while its inner angle meets in articulation the corresponding angle of the fellow of the opposite side. This meeting takes place in the middle line of the coracoidal groove, directly behind the sternal manubrium. Either coracoid furnishes about two-thirds of the articular surface of the glenoid cavity for the head of the humerus.

Passing to a *scapula*, it is to be noted that its head is much compressed from above, downwards, being fashioned to meet the clavicle mesially, and to assist in forming the glenoid cavity externally. Its blade, too, is much flattened from above, downwards, and has the exact form of a miniature cimex. Distally, it turns outwards for about half its length, and ends posteriorly in a blunt point (figs. 13 and 15).

All the bones of the *pectoral arch* are more or less pneumatic.

The Sternum (figs. 13 and 14).—Oblong in outline, the sternal body has an average length of seven centimeters, while transversely it averages about four centimeters, being somewhat wider posteriorly than it is from the base of one costal process to a corresponding point on the opposite side. Ventrally, it is much concaved, especially just within the anterior border. The manubrium is conspicuously developed, being bluntly bifurcated superiorly and wedge-shaped below—the inferior edge in the median line being very sharp. This is continued on to the carinal angle, the anterior border of the carina being concaved from before, backwards. Posteriorly, the sternal body is slightly convex and entire. Well within its margin, one upon either side, there is a large triangular foramen, the angles being slightly rounded off (fig. 14). Each costal border supports six facets for the sternal ribs. Between each facet and the one next posterior to it there is a deep little pit, with one or more pneumatic foramina at its base. Costal processes are well developed and triangular in outline. A few minute pneumatic foramina are to be seen just over the anterior border posteriorly. There is a big, strong keel to this sternum, its free margin or border being convex downwards and thickened; it runs the entire length of the bone, terminating in a little triangular area at the middle of the xiphoidal part of the body of the bone. On either side of the keel, running between the middle and lower thirds, there is a raised muscular line defining the insertion of the pectoralis major. Posteriorly, it runs into the superior defining line, which latter passes close to

the edge of the xiphoidal foramen of that side, and then passes along just below the costal border, to terminate at the articulation of the first sternal rib; this line does not show up very well in the figure. The carinal angle is an open, acute one, and the "coracoidal grooves" appear to meet at the base of the manubrium.

The Pectoral Limb (Plate IV., fig. 2, and Plate V., fig. 5).—As in not a few other species of Parrots, the bones of the forearm and hand of this Parrot seem to be only partially pneumatic, while the *humerus* is perfectly so. This latter bone possesses all the characters as we find them in the typical Macaws of the genus *Ara*. As a matter of fact, the *humerus* of *Nestor* presents identically the same characters as are to be found in the corresponding bone of the pectoral limb of *Ara chloroptera*, with which I have carefully compared it. In the latter bird, the *humerus* has a total length of 8.9 cms., while in *Nestor* it measures but 7.8 cms. It is a trifle shorter than this in the plates, for the reason that the bone is, to some extent, taken in perspective. Its shaft is short, stout, and to some degree compressed in the same plane with the head. Either extremity is very considerably enlarged—the head to some extent being flexed anconad and the distal end palmad, the two lending to the bone, for its length, the usual sigmoid curve; though this is by no means very pronounced. Proximally, the caput humeri is large, smooth, and transversely compressed; it is separated from the very prominent ulnar tuberosity by a strongly-marked incisura capitis, the former overarching a deep pneumatic fossa, at the bottom of which may be seen numerous small pneumatic foramina. A conspicuous radial crest is present, which is short, and has a convex, free edge.

Distally, the usual tuberosities are well marked and prominently elevated. Small ectopicondylar and entepicondylar processes are to be seen; but they are quite minute as compared with those found in many other birds.

The *radius* is straight, with subcylindrical shaft, and presents the usual ornithic characters at either extremity. On the other hand, the *ulna* is comparatively very stout, considerably curved along its shaft—especially along its proximal third—while the papillæ for the quill-butts of the secondary feathers of the wing are barely perceptible.

Radiale and *ulnare metacarpals* are large, with extensive articular facets for articulation with the long bones of the antibrachium and the *metacarpus*. This latter bone possesses an extreme length of 5.6 cms. Pollex metacarpal is short and projecting, while the main shaft of the bone or index metacarpal is stout and straight; on the outer aspect of its distal half a very pronounced, longitudinal groove is present. Middle metacarpal is rather slender distally, and becomes broader and compressed proximally. All of these characters are present in *Ara chloroptera*.

The distal *phalangeal joints* of manus in *Nestor* are all well developed—a fact that may be appreciated by a consideration

of their form, size, and characters in figs. 2 and 5 of the present paper. There are no claws on the ends of the finger-joints in *Nestor*, which holds true for all the *Psittacidae*.

The Pelvic Limb (fig. 6, Plate VI., fig. 16, Plate X.)—It would appear that all of the bones of this limb are non-pneumatic, judging from their colour in the dried skeleton, and the absence of pneumatic foramina at the sites where they usually are present. For a Parrot, too, the skeleton of this limb is a powerful one, the individual bones all being of large calibre with respect to their shafts, and long in proportion to the size of the bird. This is readily appreciated by comparing their lengths with the length of the corresponding one in the much larger bird, the Red-and-blue Macaw (*Ara chloroptera*).

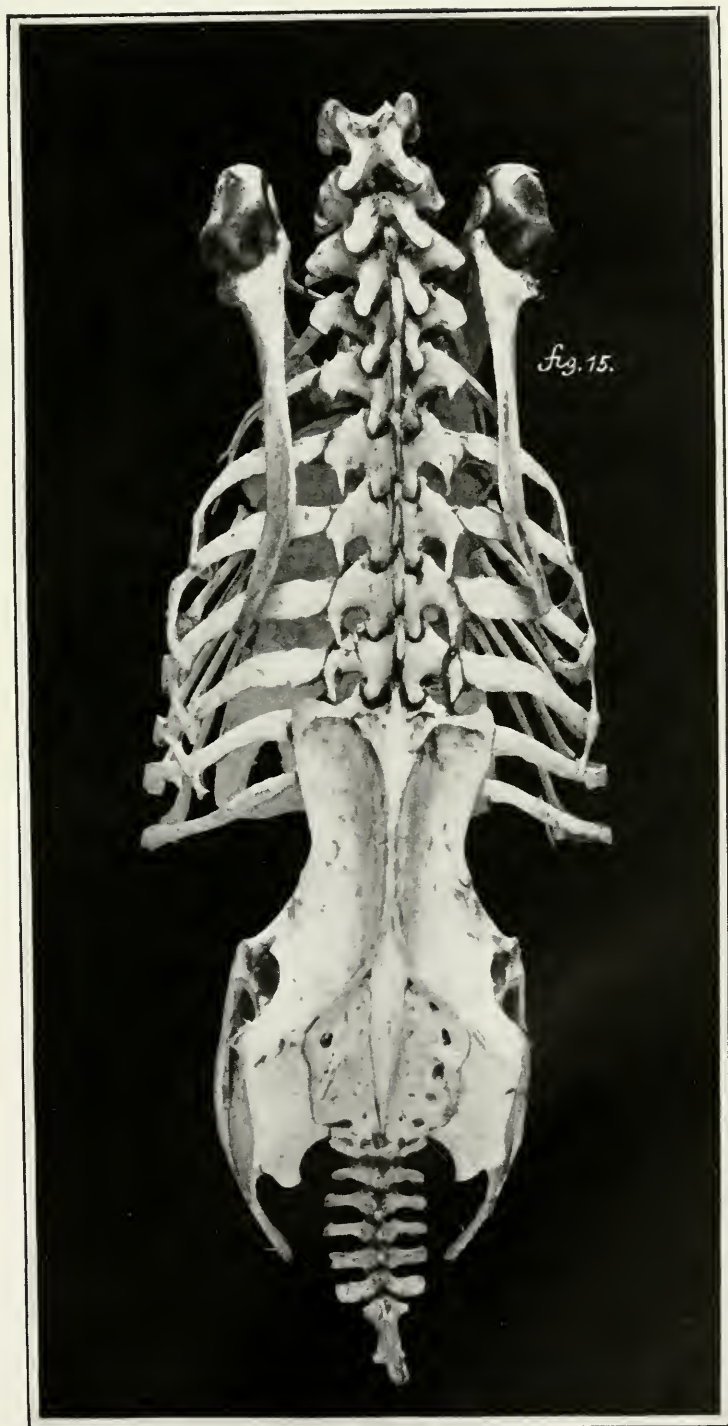
	<i>Nestor notabilis.</i>	<i>Ara chloroptera.</i>
Length of femur	.. 6.7 cms.	.. 6.5 cms.
Length of tibiotarsus	.. 10.4 cms.	.. 9.0 cms.
Length of tarsometatarsus	4.6 cms.	3.2 cms.

All the bones of this limb appear to be pneumatic in the Macaw, while upon the other hand some of the characters are quite different.

The head of the femur in the "Kea" is large and sessile with respect to the shaft. An extensive though very shallow pit is present for the insertion of the ligamentum teres. All of the summit of the bone is in the same plane, while the trochanterian prominences are much reduced, as compared with other birds of other families. Apart from being marked by certain muscular lines, the shaft of the bone is nearly straight, sub-cylindrical, and smooth. Either condyle is large and prominent, although, posteriorly, the popliteal fossa is shallow and not well defined.

A large osseous *patella* is present, which is somewhat peculiarly formed. Anteriorly it is uniformly convex and smooth; superiorly it is transversely elliptical in outline, and concaved. Posteriorly, it is much excavated for its inferior half, which produces a sharp edge for its distal border. The ligament in which it is encased is broad and strong.

Tibiotarsus of the leg is a strong, straight bone, with a big, smooth, sub-cylindrical shaft. The low *cnemial processes* are widely separated in front, and extend but slightly, though equally, down the shaft. They rise to some extent above the summit of the shaft, and possess a common, thickened margin proximad. The "fibular ridge" is rather short, and is confined entirely within the limits of the superior third of the shaft. Distally, above the condyles, the shaft is somewhat compressed in the antero-posterior direction, being nearly flat posteriorly, while in front it is shallowly grooved in the middle line, being spanned below by a small osseous bridge, above which a roughened tubercle, one on either side of the median groove, afford attachment for the ligament that in life confines the tendons passing to the dorsum of pes.



The condyles are separated by a smooth, well-marked valley or intercondylar space. In each one, their outer peripheries are elevated, especially in the case of the inner one, which at the same time is more elongate than the fellow of the other side. Both stand well out beyond the shaft posteriorly.

Passing to the consideration of the *fibula*, we find the bone to be short, stout, and straight; while distally it is sharp-pointed, and when articulated, as in life, passes but a couple of millimeters below the fibular ridge on the tibiotarsus (fig. 16). On its outer side, at the juncture of the middle and lower thirds, there is the usual tubercle for the insertion of the tendon of the biceps muscle.

Distally, as well as proximally, the extremities of the *tarso-metatarsus* are more or less compressed in the antero-posterior direction. This bone has a remarkable morphology, but this feature is still more evident in the tarsometatarsus of *Ara chloroptera*.

In the "Kea" the summit of the bone is more or less flat, though it presents the usual shallow excavations for the condyles of the tarsometatarsus. The *hypotarsus* is short, and very broad and thickened. It is once-pierced for the passage of tendons, and twice deeply grooved in the same direction, the latter being completed behind by dense ligament.

The shaft is rounded from side to side in front, and notably flat posteriorly. Just below the hypotarsus it is twice-pierced antero-posteriorly by minute foramina.

Laterally, for the upper third of the shaft internally, there is a strong longitudinal ridge developed.

At the distal end of the bone, the usual foramen for the passage of the anterior tibial artery is large, and a distinct groove leads into it from above on the anterior aspect of the shaft.

To meet the requirements of the zygodactyle foot, the big distal trochleae of this bone are turned and twisted in such a manner as to almost give this end of the bone a deformed appearance. The addition of a rather large "accessory metatarsal" rather enhances this appearance. This entire morphology and arrangement, however, is perfectly natural, and requires but a brief study to convince one of its marvellous adaptation to the various movements of the basal joints of pes in life.

From a study of the bones of the foot, as shown in fig. 16 of Plate X., it will be appreciated that not only are they arranged for the four toes upon the more usual plan of 2, 3, 4, 5 joints for the first, second, third, and fourth toes respectively, but that all these joints are unusually large and strong, with very complete and extensive interarticulations. As we would naturally expect in this notable carnivorous member of the Psittacine assemblage, the ungual joints are each sheathed in a big, strong, and curved podothecal sheath, the distal end of each being quite as sharp-pointed as we find it to be in not a few Falcons; indeed, *Nestor* possesses on a whole a foot that might well grace the pelvic limb of any average Falconine bird, or even that of some big Owl.

CONCLUSIONS.

It would seem that the opinion is now very general among ornithotomists—those living as well as those who have gone before—that the family *Nestoridæ* should be created—indeed, has been created, as pointed out in the leading paragraphs of this memoir—to contain the various species of the genus *Nestor*. The structure of the soft parts of *Nestor* seems to sustain this opinion; and these characters, when arrayed with the few striking differences presented on the part of the skeleton of the species herein considered, prove that the proposition may well be considered as finally determined.

The Nestorine osteological characters referred to have been set forth in so much detail in the foregoing pages that it would appear to be quite unnecessary to tabulate them in these conclusions. The family *Nestoridæ* may now, as just stated, be considered an established fact, in so far as the morphology of *Nestor notabilis* is concerned, and, presumably, all the other representatives of the genus.

EXPLANATION OF THE PLATES.

(All the figures are reproductions of photographs made by the author direct from the specimens shown; they are natural size, and from the same skeleton.)

PLATE IV.

- Fig. 1.—Right lateral view of the skull of *Nestor notabilis*; mandible detached.
Fig. 2.—Palmar aspect of the right pectoral limb of *Nestor notabilis*, complete, and bones normally articulated.

PLATE V.

- Fig. 3.—Basal or ventral view of the skull of *Nestor notabilis*.
Fig. 4.—Inferior or ventral view of the lower mandible of *Nestor notabilis*.
Fig. 5.—Anconal aspect of the right pectoral limb of *Nestor notabilis*; complete, and bones normally articulated. Compare with fig. 2 of Plate IV.

PLATE VI.

- Fig. 6.—Right pectoral limb of *Nestor notabilis*; median or inner aspect. *F*, femur; *p*, patella; *tb*, tibiotarsus; *tm*, tarso-metatarsus; *pes*, skeleton of the toes.
Fig. 7.—The skull of *Nestor notabilis* seen upon direct superior or dorsal view.
Fig. 8.—Ventral aspect of the leading seven cervical vertebræ of *Nestor notabilis*.
Fig. 9.—Ventral view of the eighth and ninth cervical vertebræ of *Nestor notabilis*.
Fig. 10.—Ventral view of the hyoid bones of *Nestor notabilis*; the glossohyal is detached.
Fig. 11.—Subventral aspect of the larynx of *Nestor notabilis*.
Fig. 12.—The mandible of *Nestor notabilis*, superior or ventral aspect.

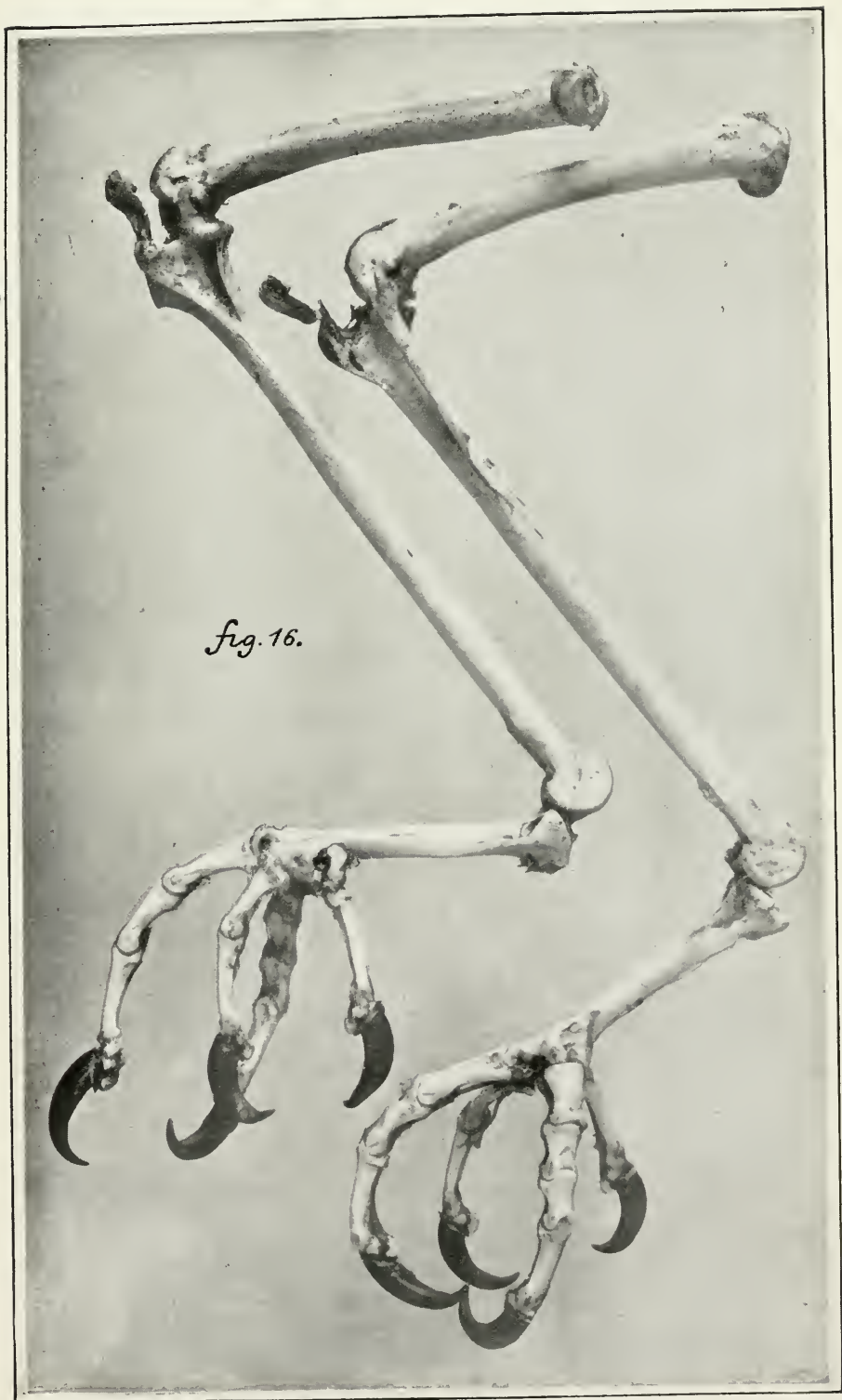




PLATE VII.

Fig. 13.—Left lateral view of the trunk skeleton of *Nestor notabilis*.

PLATE VIII.

Fig. 14.—Ventral aspect of the trunk skeleton of *Nestor notabilis*.

PLATE IX.

Fig. 15.—Direct dorsal view of the trunk skeleton of *Nestor notabilis*.

PLATE X.

Fig. 16.—The pelvic limbs of *Nestor notabilis*; the left limb is the one wherein the foot is the lower on the plate, and the fibula is in full view.

Queensland Notes.

BY D. LE SOUËF, C.M.Z.S., Hon. Sec. R.A.O.U.

I LEFT Melbourne on 12th April by train, and visited the Zoological Gardens in Sydney on the following afternoon, and was glad to see that the Birds-of-Paradise which they had obtained some months ago were still thriving, and were getting over their moult, the young feathers showing up well: there seems every chance of their living through the winter. The beautiful Fruit-Pigeons from New Guinea were also doing well. The next day I left for Brisbane, arriving there on the evening of the following day. Comparatively few birds were seen from the train, as most, if not all, the migratory birds had gone north. I did not even hear the call of the Pallid Cuckoo, usually so plentiful earlier in the year. I only remained one day in Brisbane, but visited the Museum and saw the improvements that had taken place in their collection of birds, both in the skins and the mounted specimens.

I left Brisbane late in the evening for Rockhampton, arriving in that town in the evening of the following day. During the journey a few Whistling-Eagles (*Haliastur sphenurus*), Brown Hawks (*Hieracidea berigora*), Kestrels (*Cerchneis cenchroides*), Wood-Swallows (*Artamus superciliosus*), Fantails (*Rhipidura motacilloides*), Leach's Kingfisher (*Dacelo leachi*), and Plovers (*Lobivanellus lobatus*) were seen. I only remained one day in Rockhampton, and the damage done by the recent disastrous flood was everywhere in evidence, even to a four-roomed cottage being washed across the railway track; but on the swampy ground, not far from the town, I was glad to see some Egrets, Ibis, Spoon-bills, Ducks, &c.

Early next morning I left by train for Duaringa. Mr. C. Barnard, who represents Queensland on our Council, met me here, and we drove out to his station, "Coomooboolaroo," where I remained four days—until the 22nd. There is little timber near the homestead, therefore scrub-loving birds were not seen. Both the Collared and Black-throated Butcher-Birds (*Cracticus destructor* and *C. nigrogularis*) were plentiful, and the note of the latter bird

was even more musical than that of the former, and was always a pleasure to hear. The Blue-faced Honey-eater (*Entomyza cyanotis*) was another bird with a musical note that was often heard. We saw some old nests that had been built in deserted nests of Babblers (*Pomatorhinus*), the usual place of nesting with these birds, although Mr. Barnard informed me that occasionally they build their nests apart from the Babblers. The Little Quail (*Turnix velox*) were plentiful, and were on several occasions nearly run over by the car—possibly some quite, but those we could not see or hear. Peaceful Doves (*Geopelia placida*) were plentiful. Squatter Pigeons (*Geophaps scripta*) had quite disappeared from this district after the last severe drought, but are gradually appearing again; we saw several of them. They squat on the roadside and seem disinclined to move until the vehicle is nearly on top of them. They can often be killed with the whip from a conveyance or when riding. I saw no sign of the Scarlet-shouldered Parrot (*Psephotus pulcherrimus*). They nest in the termite mounds: the last drought cleared them completely out of this district. Crows (*Corvus coronoides*) were always in evidence—in fact, while in Queensland and Northern New South Wales I either saw or heard them every day. The Black-backed Magpie (*Gymnorhina tibicen*) was also plentiful.

I left here early on Monday, 22nd April, with Mr. Barnard for Rockhampton, arriving about 11 o'clock, and left the same afternoon by train for Kunwarara, 45 miles out. Early next day we hired a jinker to take us the 45 miles on to Toorilla. The seat was made for two, but the driver and ourselves squeezed in. The day was showery, and few birds were seen, except Squatter Pigeons on the roadside. It rained heavily all that night and the next day, so no outside work was done; but the rest of the time was fine. Next morning we went to the top of a small hill near the house and obtained a fine view of the large extent of more or less swampy country to the north. Close to the foot of the hill, and in the water, was a patch of paper-bark or Melaleuca trees, and in them hundreds of Black-billed Spoonbills (*Platalea regia*) and Little Pied Cormorants (*Phalacrocorax melanoleucus*) were nesting, and the noise made by the adult birds and the young ones was quite audible. On the far side of the timber were to be seen many hundreds of Egrets, mostly the Lesser (*Garzetta immaculata*), the Straw-necked (*Carphibis spinicollis*) and White Ibis (*Ibis molucca*), Magpie-Geese (*Anseranas melanoleuca*), Whistling-Ducks (*Dendrocygna arcuata*), White-headed Shieldrakes (*Tadorna rufigerum*), Coots (*Fulica australis*), as well as many Native Companions (*Antigone australasiana*). It was a most interesting sight, from which we found difficulty in tearing ourselves away. At the back of us was much open plain country, interspersed with belts of timber, mostly Melaleuca, and there were many greenish spots where water lay, and these looked as if a white sheet had been thrown over them, as small flocks of Egrets had settled round them to feed. What interested us most

was that flocks of the Lesser Egrets, from one pair of birds to about thirty, were continually flying from the swampy ground towards the sea coast; the total would run into thousands. We determined to follow these birds down, and if possible find their nesting rookery; so, taking our lunch and the camera, we started off on foot. We found the level country much interspersed with water, and in such places long grass usually grew, therefore much wading had to be done, which, of course, we could not undress for. The heavy rain the day before had filled up most of the shallow depressions. We frequently heard the double note of the Brown Quail. When disturbed at close quarters they flew up with a whirr. They came into the garden of the homestead and were easily called up by imitating their call. We also saw a few King or Chestnut-bellied Quail (*Excalfactoria australis*). On the ridges of the higher land Eucalyptus trees grew, but on all the low-lying country belts of paper-bark (*Melaleuca*). About one in fifty of these had a flange on the trunk varying in size and height from the ground, which always contained a certain amount of sweetish-tasting water close to the outer edge, so that if a shallow cut is made the water, which is quite good to drink, squirts out.

We passed a post of a fence, and from it ants were swarming and hundreds flying away. The birds had found them out, and thirteen Black-and-White Fantails (*Rhipidura motacilloides*), two Restless Flycatchers (*Seisura inquieta*), many Welcome Swallows (*Hirundo neoxena*) and Fairy Martins (*Petrochelidon ariel*) were busily catching the flying ants. We noticed two dead cows, and Crows were naturally not far off. The cattle may have died from the result of ticks, these animals being very numerous in this country, and the cattle have to be regularly dipped in arsenic and soda every month. You sometimes see a beast with many thousands of ticks, especially on its head. Pigs have gone wild in many parts of Queensland, and we saw a mob of 20, and 40 had been caught not long before our visit. In the Cooktown district they are accredited with rooting up the Scrub-Turkeys' (*Catheturus lathamii*) nests and eating the eggs. It was interesting to watch the wonderful flight of flocks of Straw-necked and White Ibis as they slowly circled round and round, gradually getting higher all the time, and rarely flapping their wings. Egrets occasionally did the same thing, and got so high up as to be hardly visible. We saw a few kangaroos, and tracks of dingoes. Butcher-Birds (*C. destructor*) were seen, and I was informed that a person had seen five small dead birds hanging in the forks of branches of a shrub close together, waiting to be made a meal of by one of these birds. A Little Falcon (*Falco lunulatus*) flew past, and Mr. Barnard informed me that he had seen one of these birds chasing bats in the evening, but that as the Falcon sought to seize them they dodged below and escaped the clutches of the bird of prey; but one bat kept above, and was promptly caught. I saw three Crows hustling a Whistling-Eagle, and one pecked him on the back, which made the Eagle cry out, and, turning round, he chased

that Crow, but the latter bird zigzagged rapidly to the ground and escaped, just the same way as when a Sparrow-Hawk or Falcon attacks Nankeen Night-Herons (*Nycticorax caledonicus*) they at once fly on to the ground. We often notice it at the Melbourne Zoo.

When passing a small swamp much overgrown with bulrushes we saw an Allied Swamp-Hawk (*Circus gouldi*) attempt to strike a Coot, which was on the water; but the latter bird was too quick for him, and, calling out, quickly dived, throwing up water at the Harrier at the same time with its feet. Several Whistling-Ducks (*Dendrocygna arcuata*) were on the same water, and uttered their musical note; they dived also, and betook themselves to the rushes for safety. These birds frequently nest on the ground, and usually near water. Black Ducks (*Anas superciliosa*) only occasionally nest in hollows in trees; they nest usually in the long grass of the plains, and often well away from water.

Native Companions only seemed to be in pairs on the plain country. They often uttered their loud, shrill call, and were answered by others in the distance. They are usually much more noisy in the evenings. Most of the white ants' or termites' mounds we passed had been burrowed into by the porcupine ant-eaters, or echidna, in their search for food. In the thicker patches of grass, where the ground was dry, we usually saw tracks made by the Grass-Owls, bush rats, and kangaroo rats, but pigs often camped in these places too. On examining the small swamps, or swampy ground on the plains, where the grass was usually green, and where the flocks of Egrets settled, we soon found out why the birds came here, as the vegetation was more or less alive with thousands of small frogs of two kinds. Mr. Barnard has often noticed that many frogs have cannibalistic tendencies, and eat one another whenever they get a chance and are hungry. We also noticed numbers of small fresh-water snails, which are eaten by the Egrets and Ibis.

The next day was spent wading, with a camera, in the swamp among the Cormorants and Spoonbills. It is difficult to describe the interest of being in a colony of nesting birds, hearing the raucous call of the parent birds, the shrill cries of the young of various sizes, and the gurgling noise they often make when being fed, as well as the rustle of the birds' wings. Both kinds of birds nested in the same trees, the Spoonbills' nests being larger and usually placed higher up. We noticed that, although the Cormorants were all of the Pied variety, many of the young were pure black, while others had light-coloured breasts. They were in all stages of growth—some just hatching, and others ready to fly. We only found one nest of the Yellow-billed Spoonbill (*Platibis flavipes*)—it contained three eggs; but there were hundreds of nests of the Black-billed. When we waded close to a Melaleuca tree on which nests were, the larger young Cormorants got very restless, and frequently climbed out of the nests, and at the same time vomited up the contents of their stomachs, so we had to



Cormorants' Rookery at Toorilla.



Spoonbill Rookery, Toorilla, Queensland.

avoid passing underneath these trees. Several fell into the water, and, although they could swim and dive well even at that early age, they often got entangled in the water weeds at the bottom, and so were drowned. We saw several dead ones floating on the water. The Spoonbills were much quieter.

The water was mostly thickly covered with floating water-fern (*Azolla*), of a reddish hue, and only patches, so to speak, were clear, and in these were seen small flocks of White-headed Shieldrakes or Burdekin Ducks (*Tadorna rufiltergum*). When we stood still they came quite close to us; the male uttered a deep note and the female a much higher key. They had evidently finished nesting. Mr. Barnard stated that they usually nest in trees. Not far off, among the bulrushes, and perched on trees, was a flock of about one hundred Pied or Magpie Geese (*Anseranas melanoleuca*). As we approached them they all flew up, and the loud noise made by their wings as these heavy birds rose in the air could be heard a long way off. They also were not nesting. Black Moor-Hens (*Gallinula tenebrosa*) were plentiful, and a few Coots (*Fulica australis*) were seen. Not far from the trees, and on the ground, were congregated a large body of White Ibis, probably feeding on frogs, &c. Further away we saw many—fully one hundred, if not more—Native Companions. These interesting birds were often bowing one to the other, and taking jumps into the air with the aid of their outstretched wings and going on with various similar antics. We saw many Black-throated Grebes (*Podiceps gularis*) on the clear water.

Whistling-Eagles (*Haliastur sphenurus*) were nearly always visible, and their cry was constantly heard. We saw one roosting on a tree, just above some Spoonbills' and Cormorants' nests; the latter birds did not seem to mind him in the least. Allied Swamp-Hawks (*Circus gouldi*) were often seen; they frequently disturb the Egrets when they are feeding on the plains. Wedge-tailed (*Uroaëtus audax*) and the White-bellied Sea-Eagle (*Haliaeetus leucogaster*) were occasionally seen soaring high overhead. Crows, as before stated, were also much in evidence, and must be truly hated by the nesting birds on account of their thieving propensities, always noticeable should any eggs or very young birds be left unguarded. A flock of about sixty Pelicans (*Pelecanus conspicillatus*) were resting on a drier portion of ground, and they looked very conspicuous against the dark background. The birds here had been late in nesting, as the heavy rain and cyclone in January had destroyed practically all the Ducks' eggs, as well as many nests of tree-building birds, as the swamp was a sea of water. Mr. Broome, the manager, informed us that shortly after the cyclone was over he went round the flood-marks of the swamp, where the *débris* had been deposited, and found many dead Coots—these, being weak-flying birds, would naturally suffer; also a few Native Companions—these birds are apt to get their wings broken by heavy weather; many thousands of drowned native rats (in one spot he counted 32 in one square yard), plenty

of mice, a few dead snakes and numbers of live ones, mostly black snakes (*Pseudechis porphyriacus*), also kangaroo rats and similar animals. Crows and Butcher-Birds were busy regaling themselves on the dead remains. We evidently have no conception of the amount of animal, bird, and insect life destroyed by these disastrous cyclones.

Mr. Ernest Barnard visited Toorilla in March, 1913, and saw a rookery of both Straw-necked and White Ibis together on the far side of the swamp. There were about 30 to 40 nests, which were built among scattered reeds growing in about four inches of water. The nests were built of rushes plastered with excreta, and in some cases six or seven would be joined together. Single nests were uncommon; twos and threes joined together were the rule. He saw no crocodile tracks. It is unusual for Ibis to nest so close to the ground; he states that a very slight rise of water would swamp the nests. When returning to the homestead we flushed about fifteen Stone-Plovers (*Edicnemus grallarius*) that were congregated under the lee of a rise. I do not remember seeing so many together before.

During the evening we heard a pair of Winking Owls (*Ninox connivens*) in the trees of the rookery. The note of the female was in a higher key than that of the male; the note sounded like "Wouf, wouf."

Next morning we drove to the other side of the swampy plain to see the nest of a Jabiru (*Xenorhynchus asiaticus*). A huge old nest had been blown down, but a new nest had been started at the top of a large bean-tree. The nest was difficult to detect from the ground, on account of the foliage. Mr. Berney had noticed another pair nesting, but we could not locate them. About 50 yards away from the Jabiru's nest a pair of White-bellied Sea-Eagles had a very large nest on a eucalyptus tree; the female bird was watching us from a neighbouring tree as we took the photo. Close by this place a creek ran out over the plain, consequently the Egrets congregated here to catch what they could in the shallow running water. Mr. Berney had noticed an Osprey (*Pandion leucocephalus*) nesting nearer the coast than where we were when he visited Toorilla last year.

We now drove back to the homestead and caught the coach—a buck-board buggy with one seat—back to Kunwarara, and went on next morning (Monday) to Rockhampton. The train passed through a good many patches of scrub, and in all of them the introduced prickly-pear cactus (*Opuntia*) was growing thickly—so much so that in many places it would be difficult to get through. Scrub-Turkeys were also plentiful, and I was informed that last year about 1,000 of these birds were shot and sent to Rockhampton for sale.

We visited the Botanical Gardens during the afternoon, and noticed a fine Cassowary (*Casuaris australis*), Scrub-Turkey (*Catheturus lathamii*), and other birds in their enclosures, and plenty of water-fowl in a small lake close by, where they are pro-

tected. It is astonishing how quickly these birds find out water where they are not disturbed. The same evening I gave an illustrated lecture on "Bird-Life," under the auspices of their local Bird Protection Society, to an audience of about 400, mostly young folk, and next day (Tuesday) I left for Brisbane, arriving there on Wednesday morning. I was able to see several of our members there, and Mr. Longman, the Director of the Museum, kindly showed me the cases of mounted birds; they have been much improved, and form an instructive exhibit. In the evening I gave a lecture before the Field Naturalists' Club, and met many members well known in Victoria.

On the following day I was enabled to visit the aviaries of our member, Mr. T. C. Marshall. He has twenty-six kinds of native birds doing well. These include the Yellow-eared Honey-eater (*Ptilotis chrysotis*), Brown Honey-eater (*Stigmatops ocularis*), Noisy Pitta (*Pitta strepitans*), and Scaly-breasted Lorikeet (*Trichoglossus chlorolepidotus*). In the evening I lectured before the Royal Geographical Society on the birds found on our southern islands, and left next morning for Glen Innes, N.S.W., arriving there in the evening: and early next day went by motor to Inverell. On the way we saw a pair of Wedge-tailed Eagles perched on a tree by the roadside, also Galahs (*Cacatua roseicapilla*) and Grey Jumpers (*Struthidea cinerea*). I caught the 9.30 a.m. train for Wialda station, and here our member, Mr. S. A. Hanscombe, kindly met me. In the evening I gave a lecture in the local hall to about 200 persons, mostly school children. It was interesting to notice that a pair of Variegated Wren-Warblers (*Malurus lamberti*) nested, not only in a rose-bush in Mr. Hanscombe's garden, but also on a creeper on the wall of his verandah, and close to a window where the family frequently sat during the day, thus showing how tame these little birds become if not disturbed. Next day (Sunday) Mr. Hanscombe drove me to Wialda itself, about 4 miles from the station township. On Monday I took a long walk over the poor sandstone country at the back of the town, but birds were not plentiful, and only the commoner kinds were noted. In the evening I gave a lecture in the local State school to the children and their parents; about 250 attended.

Next day I went on to Moree, and met our member, Mr. Morse, there, and gave a lecture in the evening in the Council Chamber, but it could not accommodate all those who wished to attend, which clearly shows how interested people are in natural history generally and in our birds especially. On leaving this town for Sydney I had the pleasure of seeing four adult Bustards (*Choriotis australis*) not far from the line. They are being thinned out by foxes, along with so much of our other native game. The railway lines frequently had no fences on either side, and whistling had to be done by the driver to frighten stock off the lines. Large flocks of Galahs were seen on the plains, also some Emus (*Dromaius novaehollandiae*) and kangaroos.

I finished up by giving a lecture in Sydney, and arrived back in Melbourne on 8th April.

A Study of Australian Specimens of the Little Penguin (*Eudyptula minor*, Forster).

BY W. B. ALEXANDER, M.A., AND DR. BROOKE NICHOLLS.

INTRODUCTORY.

IN *The Emu*, vol. xvii., p. 118, one of us (Nicholls) gave an account of the Penguin rookery on The Nobbies, Phillip Island, Western Port, Victoria, and in concluding his paper stated that no attempt had been made to describe or contrast the general coloration of the specimens collected, but that he hoped to do so at a later date. This work has now been carried out by us jointly at the National Museum, Melbourne, through the kindness of the Curator, Mr. J. A. Kershaw, F.E.S. In addition to the skins obtained at Phillip Island by Nicholls, McLellan, and Tregellas, now in the R.A.O.U. collection, we have carefully examined the birds from New South Wales in the "H. L. White Collection," birds from various parts of the Victorian coast and from Cat Island, Bass Strait, in the National Museum, birds from Western Australia (lent by the Western Australian Museum), and a bird from South Australia kindly lent by Capt. S. A. White. Altogether, 60 skins were thus available to us for comparison, including specimens from Cabbage-tree Island, Port Stephens, New South Wales (about S. lat. 32° 40'), the most northerly breeding-place of the species known on the east coast, and specimens from Penguin Island, near Rockingham, Western Australia (about S. lat. 32° 20'), the most northerly breeding-place known on the west coast. Incidentally, it is worthy of remark that these two northern limits of the species are almost in the same latitude.

Before stating the results arrived at, it may be well briefly to outline the position on which it was hoped that light would be thrown. For many years Australian ornithologists, following Gould, considered that there were two species of small Penguins—the Little Penguin (*E. minor*) and the Fairy Penguin (*E. undina*)—found on the Australian coast. The former was supposed to be larger and lighter in colour; the latter smaller and darker. Mathews, in 1911, in his "Birds of Australia," challenged this view, stating that in his opinion all the small Australian Penguins belonged to one species, and we think that the study by Nicholls of the birds on The Nobbies has furnished proof that he was right in this contention, the *minor* form having been shown to be the bird just before moulting, when it is fat and its feathers have worn dull, whilst the *undina* form is the same bird freshly moulted.

Forster's *Aptenodytes minor* was founded on birds from New Zealand, and Mathews has shown that Australian birds are separable from those from New Zealand, being characterized by their white tails and lighter coloration. Hence, in his "Birds of Australia" he used the name *Eudyptula minor novæhollandiæ* for the Australian sub-species, *Spheniscus novæ-hollandiæ* being the

name given by Stephens to Latham's description of the Watling drawing of a bird from Port Jackson. Mathews added ("Birds of Australia," vol. i., p. 285):—"The few specimens from each locality I have studied have not allowed me to designate any sub-species of the Australian bird." In the same year (1911) in which he wrote this, however, in his "List of the Birds of Australia," published in *Novitates Zoologicae*, vol. xviii., he separated the Western Australian bird under the name of *E. minor woodwardi*, stating that it differed from *E. m. novæhollandiæ* in its grey-blue coloration above, and the flipper being grey and not blue. The type was a bird from Sandy Hook Island, in the Recherche Archipelago, on the south coast of Western Australia, collected by Mr. J. T. Tunney in November, 1904.

In his "List of the Birds of Australia," published in 1913, Mathews retained this sub-species from Western Australia, limited *E. m. novæhollandiæ* to birds from New South Wales, and used Gould's name, *undina*, as a sub-specific name for a third Australian race, *E. m. undina*, whose range is given as Tasmania, Victoria, and South Australia.

MATERIAL STUDIED.

The 60 specimens studied by us may be classified as follows:—

1. *Nestlings in down*.—One from Cabbage-tree Island, New South Wales, collected in September, and one from Cat Island, Bass Strait, collected in December. Of these, the former, which is the younger, is dark chocolate brown, whilst the latter is rather paler.

2. *Young birds, partly in down, partly feathered*.—Three from Cabbage-tree Island, New South Wales, collected in January; four from Phillip Island, Victoria, collected in March; two from Tollgate Island, New South Wales, collected in September; and two from Cat Island, Bass Strait, collected in December. The down on these birds is light chocolate-brown above and white below. In some birds the down on the throat is smoky-brown, in others yellowish. This difference can evidently not be used in separating sub-species, since some birds from New South Wales show one character and some the other. The down is lost first from the breast and lower back, and the loss progresses forwards, the down remaining longest above the flippers and on the head. The fresh feathers on these birds are precisely similar in colour and form and present the same variation in colour in different specimens as is found in moulting or freshly-moulted adults.

3. *Adult birds moulting*.—One female from Phillip Island, Victoria, collected in March.

4. *Birds freshly moulted* ("undina" stage).—Four from Phillip Island, Victoria (one ♂, one immature ♂, two ♀), collected in March; one from the Coorong, South Australia (♂), collected in March; one from Mordialloc, Victoria (immature ♂), collected in April; one from Penguin Island, Western Australia, collected in December.

Freshly-moulted birds can be distinguished immediately by the transverse lines visible on the white breast feathers. We have traced these lines to the impression left on the feathers by the base of the quill of the old feather. The tip of the young feather is enclosed for about a millimetre in the quill of the old one, and the barbs are thereby held together at the tip whilst tending to expand lower down; a slight mark is thus made on each barb, and when the old feather finally falls off and the barbs spread out flat, these marks form a straight line across the feather close to its tip. These lines are readily visible on the white feathers on the breast, and on searching they were found to be present also on the dark feathers of the back. They were referred to by Nicholls in his previous paper, but, as far as we are aware, had not previously been noticed or explained. The marks evidently do not last long, but they do not disappear directly the bird enters the water after moulting, as we were at first inclined to think, since in one specimen, caught at The Nobbies just after it had come out of the water, they are still plainly visible.

5. *Birds in fresh plumage* (still in the *undina* stage).—One from Phillip Island, Victoria (♂), collected in March; one from Phillip Island and two from Queenscliff, Victoria, unsexed, and without dates of capture. These birds are as brightly coloured as freshly-moulted birds, but show no lines on the breast.

6. *Birds in worn plumage* (intermediate between *undina* and *minor* stages).—One from Penguin Island, W.A. (♀), April; one from Mordialloc, Vic. (♂), June; one from Mordialloc, Vic. (♂), July; one from the Melbourne Aquarium (♂), July; five from Mordialloc, Vic. (one ♂, four ♀), August; one from Tollgate Island, N.S.W. (♂), September; one from Mordialloc, Vic. (♀), September; one from Cabbage-tree Island, N.S.W., October; four without data. These birds are evidently the worse for wear, the blue edges to the feathers being quite worn off the flippers, whilst on the back the feathers have become dull, but are still blue rather than grey.

7. *Birds in much-worn plumage* (*minor* stage).—Three from Cabbage-tree Island, N.S.W. (two ♂, one ♀), January; eight from Phillip Island, Vic. (three ♂, five ♀), March; one from Mordialloc, Vic. (♀), April; one from Phillip Island, Vic., June; two from Mordialloc, Vic. (one ♂, one ♀), August; one from Tollgate Island, N.S.W. (♀), September; one from Recherche Archipelago, W.A. (♂), October; one from Recherche Archipelago, W.A. (♂), November; one without data. These birds are grey rather than blue above, and the flippers are entirely dull grey, the white edges having become dirty. The type of Mathews's *E. m. woodwardi*, from the Recherche Archipelago, W.A., is evidently a bird in this plumage, similar to the two from the same locality recorded above, which were collected at the same time. These birds can be precisely matched among specimens from Victoria and New South Wales.

Classing groups 2, 3, 4, and 5 together as birds showing fresh

plumage, it will be seen that these have been obtained in September, December, January, March, and April. Birds in group 6, with worn plumage, have been obtained in March, April, June, July, August, and September; whilst birds in group 7, with much-worn plumage, have been obtained in August, September, October, November, January, March, April, and June—that is, at every season of the year.

COLORATION.

In the "Birds of Australia" Mathews wrote:—"Nothing but the study of series from breeding-places will serve to explain their variation. General coloration will, I believe, be of the greatest value if correctly used. If only freshly-moulted birds are used for comparison, differences will be noted in coloration, which, I think, a large series will emphasize."

We have carefully studied the freshly-moulted birds in the series before us, which, as stated by Mathews, show very considerable variation in the colour of the feathers. Each feather has a black stripe down the middle and a blue patch on each side, and in freshly-moulted birds the colour of the feathers on the back and the flippers corresponds precisely, though owing to the smaller size of the feathers on the flippers the general colour effect may be rather different, owing to the patches of black and blue being more closely intermingled on the flipper. In worn specimens the blue colour on the back is often still evident after all blue has disappeared from the flippers, as noted above. The feathers on the sides are always lighter than those in the centre of the back.

The blue may be pale electric-blue or dull grey-blue or any intermediate shade. The series of moulting or freshly-moulted specimens, numbering 19, examined by us form an almost continuous series, which can be arranged as in the succeeding table, where each bird is lighter than the one immediately below it.

FRESHLY-MOULTED AND MOULTING PENGUINS ARRANGED IN ORDER OF COLOUR.

Shade of Blue.	Locality.	Age and Sex.
Lightest (greenish)	Cabbage-tree I., Port Stephens, N.S.W.	Young.
"	Queenscliff, Port Phillip, Vic. ..	Adult.
Light	Penguin I., Rockingham, W.A. ..	Adult.
"	Coorong, S.A.	♂
"	Queenscliff, Vic.	Adult.
Medium	Cabbage-tree I., N.S.W.	Young.
"	Cat I., Bass Strait	Young.
"	Tollgate I., N.S.W.	Two young.
"	Phillip I., Western Port, Vic. ..	Three young.
Dark	Phillip I., Vic.	Young ♂.
"	Phillip I., Vic.	Two adult ♂.
"	Phillip I., Vic.	Adult.
Darkest (blackish)	Cat I., Bass Strait	Young.
"	Phillip I., Vic.	Adult ♀.
"	Cabbage-tree I., N.S.W.	Young.

Though the series available is not as long as could be desired, it is, we think, sufficient to show that the colonies of *Eudyptula minor* in the different States of Australia cannot be separated on the basis of colour. Whilst all the birds from Phillip Island are medium or dark, we have two light birds from Queenscliff, only a few miles away, whilst of the three young birds from Cabbage-tree Island one is the lightest bird in the series, another the darkest, and the third in the middle of the list. The bird from Penguin Island, Western Australia, is very light in colour, though it should belong to the sub-species separated by Mathews on account of its being duller in colour than the eastern Australian form. It is clear that both light and dark birds are found in the two States (Victoria and New South Wales) from which we have more than one specimen, and the single specimens from South Australia and Western Australia, though both light, are not quite as light as one of the birds from each of the other States.

DIMENSIONS.

The two forms, *E. minor* and *E. undina*, as already mentioned, were supposed to differ in coloration and size, and, in particular, the size of the bill was at one time regarded as differentiating them. Mathews gives the measurements of the exposed portion of the culmen of *E. minor novæhollandiæ* as—length 38 mm., depth 12 mm.; whilst those of *E. m. iredalei*, a sub-species from the Chatham Islands, which he considers close to *undina* in measurements, are given as—length 34 mm., depth 16 mm.

In his previous paper Nicholls gave a series of measurements, which showed that the birds in one colony varied considerably. He also showed that the bills of males were, on the average, larger than those of females. We have measured the length and depth of the bill in all the adult birds available, and these measurements, together with those of the adult birds previously given by Nicholls, are shown in the following table:—

MEASUREMENTS OF BILLS OF LITTLE PENGUINS.

MALES.					FEMALES.				
Locality.	Length in mm.	Depth in mm.	Length. in mm.	Depth.	Locality.	Length in mm.	Depth in mm.	Length. in mm.	Depth.
<i>Victoria.</i>					<i>Victoria.</i>				
Mordialloc (Port Phillip)	37	14	2.6		Mordialloc (Port Phillip)	34	12	2.8	
Mordialloc	36	13	2.8		Mordialloc	31	12	2.6	
Mordialloc	37	16	2.3		Mordialloc	35	13	2.7	
Mordialloc	35	14	2.5		Mordialloc	35	14	2.5	
Melbourne Aquarium	36	16	2.3		Mordialloc	35	13	2.7	
Phillip I. (Western Port)	38	14	2.7		Mordialloc	36	14	2.6	
Phillip I.	37	15	2.5		Mordialloc	36	14	2.6	
					Phillip I. (West. Port)	35	11	3.2	

MALES.					FEMALES.				
Locality.	Length in mm.	Depth in mm.	Length. Depth.		Locality.	Length in mm.	Depth in mm.	Length. Depth.	
Phillip I.	37	15	2.5		Phillip I.	37	12	3.1	
Phillip I.	40	15	2.7		Phillip I.	35	12	2.9	
Phillip I.	37	14	2.6		Phillip I.	35	12	2.9	
Phillip I.	41	14	2.2		Phillip I.	38	13	2.9	
Phillip I.	40	14	2.9		Phillip I.	36	13	2.8	
Phillip I.	40	13	3.1		Phillip I.	35	12	2.9	
Phillip I.	38	13	2.9		Phillip I.	39	13	3.0	
Phillip I.	37	12	3.1		Phillip I.	38	13	2.9	
Phillip I.	37	15	2.5		Phillip I.	39	12	3.3	
Phillip I.	39	14	2.8		Phillip I.	36	12	3.0	
Phillip I.	38	14	2.7		Phillip I.	38	12	3.2	
Phillip I.	37	12	3.1		Phillip I.	37	12	3.1	
Phillip I.	37	12	3.1		Phillip I.	35	12	2.9	
Phillip I.	39	15	2.6		Phillip I.	35	14	2.5	
Phillip I.	39	14	2.8		Phillip I.	38	13	2.9	
Phillip I.	38	12	3.2		Phillip I.	36	15	2.4	
Phillip I.	37	12	3.1		Phillip I.	38	13	2.9	
Phillip I.	35	12	2.9		Phillip I.	38	13	2.9	
Phillip I.	38	13	2.9						
Phillip I.	35	12	2.9						
<i>New South Wales.</i>					<i>New South Wales.</i>				
S. Tollgate I. ..	40	16	2.5		S. Tollgate I. ..	38	16	2.4	
Cabbage-tree I. (Pt. Stephens)	38	14	2.7		Cabbage-tree I. (Pt. Stephens)	42	18	2.3	
<i>Western Australia.</i>					<i>Western Australia.</i>				
Mondrain I. (Recher- che Archipelago)	39	14	2.8		Penguin I. (Rocking- ham)	38	14	2.7	
Mondrain I.	40	14	2.9						
<i>South Australia.</i>									
Coorong	31	10	3.1						

SEX NOT DETERMINED.

<i>Victoria.</i>				<i>New South Wales.</i>			
Western Port ..	35	14	2.5	Cabbage-tree I. (Pt. Stephens) ..	41	15	2.7
Queenscliff (Port Phillip)	30	11	2.7				
Queenscliff	34	14	2.4	<i>Western Australia.</i>			
Phillip I. (Western Port)	35	11	3.2	Penguin I. (Rocking- ham)	35	13	2.7
Phillip I.	35	13	2.7				
Phillip I.	34	11	3.1	<i>Locality unknown.</i>			
				National Museum, Melbourne ..	37	14	2.6
				National Museum, Melbourne ..	31	12	2.6
				National Museum, Melbourne ..	38	14	2.7
				National Museum, Melbourne ..	37	13	2.8
				National Museum, Melbourne ..	35	16	2.2

The foregoing figures show a range in length from 30 to 42 mm., and in depth from 10 to 18 mm., the ratio of length to depth varying from 2.2 to 3.3. Four specimens have bills markedly smaller than the rest—viz., one from Queenscliff (not sexed), 30 x 11; one from Coorong (♂), 31 x 10; one from Mordialloc (♀), 31 x 12; and one without locality, in the National Museum (not sexed), 31 x 12. If these four specimens are omitted, we may state that the bill in *E. minor* varies from 34 to 42 mm. in length, and from 11 to 18 mm. in depth.

We incline to the view that these birds with small bills are first season birds. We would have supposed them to be immature, but Captain White assures us that the specimen from South Australia had mature sexual organs. The bill measurements of six immature birds have been given by Nicholls in his previous paper:—Immature ♀, 25 x 9; immature ♂, 28 x 11; immature ♂, 30 x 11; immature (not sexed), 30 x 11; immature ♂, 34 x 11; immature ♂, 37 x 13. We think these figures strongly support our view. The alternative is to suppose that the four birds belong to a distinct small-billed species or sub-species, and personally we do not believe this.

The bill-lengths of the individuals measured may be summarized as follows:—

Length of Bill in mm.	No. of Males.	No. of Females.	Total.
30	—	—	1
31	1	1	3
32	—	—	—
33	—	—	—
34	—	1	3
35	3	8	17
36	2	5	7
37	10	2	14
38	6	8	14
39	4	2	6
40	5	—	5
41	1	—	2
42	—	1	1

These figures, when plotted in a graph, suggest that the true form of the curve is one with three maxima—one at about 31 mm., which, we suggest, is the average bill-length of immature or first-season birds; a second at about 35 mm. in females and 37 mm. in males, which, we suggest, may be the averages of one-year-old birds; and a third, at about 38 mm. in females and 40 mm. in males, which may be the average length of the bill in birds of two years old and over.

It is worth noting that the five birds from New South Wales

all have large bills, the averages and variations in the birds from the different States being as follows :—

State.	Largest.		Smallest.		Average.		Mean.
	♂	♀	♂	♀	♂	♀	(No. of specimens in brackets.)
New South Wales	40	42	38	38	39	40	39.8 (5)
Victoria	41	39	35	34	38	36	36.8 (57)
Western Australia	40	38	39	38	40	38	38.0 (4)

The numbers are, of course, too small to found any conclusions on them, though they certainly suggest that Victorian birds have smaller bills than those from the more northern States.

CONCLUSION.

In conclusion, we think we may claim to have shown that all the Penguins that breed on the coasts of Australia belong to one race, for which the proper name is *Eudyptula minor novæhollandiæ*, and that no further differentiation of forms is possible on the evidence at present available. Mr. Mathews has specially appealed to Australian ornithologists to study the problem on the spot, and we have done so entirely without prejudice, with the above result. We do not think Mr. Mathews has anywhere stated how many skins had been examined by him when he separated the Australian birds of this species into three sub-species. We have given full details of the numbers available to us and the localities from which they were obtained, so that in any further discussion of the subject other workers may know exactly on what material our conclusion is founded.

Protection of Birds.

WE have received vol. ii. of "The Statement of the Permanent Wild Life Protection Fund" of the U.S.A., 1915-16, and we heartily congratulate the author, Dr. W. T. Hornaday, on what he has brought before us and on the good work that has been done by the Fund. It is difficult to realize how any of the American States can possibly refuse to protect fully their animal and bird life after reading what is brought before them in this book; but possibly many do not want to read it.

It is with pleasure that we are able to state that the Victorian Parliament has just passed an amendment of the *Game Act*, which prohibits the possession of feathers and eggs of practically all our valuable insectivorous birds, including the Egret. Our hon. secretary has been trying to get this done for years past, and we congratulate the last Government (which had Sir Alexander Peacock as its Premier) upon having passed such a much-needed

law, which we must now all help to carry out. The clauses in it which are especially valuable are as follows:—"6. In section nine of the Principal Act—(a) 'Any person who buys sells consigns or knowingly has in his possession house or control any flesh skin feathers or other portion of any game or native game killed or destroyed during any period in which such killing or destroying was or is prohibited by this Act or by any Proclamation thereunder shall for every such offence be liable to a penalty of not more than Five pounds and for every subsequent offence to a penalty of not less than Ten pounds or more than Fifty pounds'; (b) at the end of the said section nine there shall be inserted the following sub-section:—'(2) After the first day of January One thousand nine hundred and eighteen so far as regards Egrets and so far as regards any other native game specified in any proclamation to be made by the Governor in Council for the purposes of this sub-section any person so offending shall be liable to the like penalties as aforesaid whether such Egrets or native game were killed or taken in Victoria or elsewhere.'"

We are glad to notice that a similar provision is before the Parliament in New South Wales.

The Duchess of Portland presided at the twenty-seventh annual meeting of the Royal Society for the Protection of Birds, held at the Middlesex Guildhall on 12th March, 1918. The society's gold medal was presented, through representatives, to Dr. Hornaday and Dr. C. Gordon Hewitt, for their successful efforts in forwarding the treaty—the first international treaty for such a purpose—between the United States and Canada for the protection of birds migrating between those countries. This treaty protects all bird-life between the Gulf of Mexico and the North Pole, and has saved American farmers many millions of dollars, inasmuch as that hitherto the loss in crops destroyed by insects amounted in the United States to 520,000,000 dollars.

Mr. Butler, attaché to the American Embassy, replaced Mr. Page, who was unable to attend, and represented Dr. Hornaday. In thanking the society for this distinction, awarded for the first time to an American, he said that the news would be of keen interest to all those interested in bird-life throughout the States. He compared moths and insects to the enemy submarines, and the birds to the aviators who watch and destroy them.

Dr. C. Gordon Hewitt, who was formerly a lecturer at Manchester University, and has since done so much by both speech and pen for the bird-life of Canada, was represented by Sir George Purley.

Birds that do more harm than good, if there are such, are not worth mentioning—their number is so small; and it was suggested that if farmers were made to understand this through chambers of agriculture and farmers' unions from a materialistic point of view, results would be more satisfactory than if the propaganda

came through private sources, which are generally looked upon with suspicion.

An instance was given regarding the woods which have been felled, where the insects swarming to the newly-cut stumps were so overwhelming in their numbers that it will be impossible to use those same woods for years unless the birds are allowed to save them.—*The Queen*, 23/3/18.

Description of a New Sub-species of *Hylacola pyrrhopygia* (Vig. & Hors.)

BY F. E. HOWE, C.M.Z.S., R.A.O.U.

THROUGH the courtesy of Mr. H. L. White, of Belltrees, I was enabled to exhibit before the Bird Observers' Club of Victoria, on 22nd March, 1917, skins of a mature male and an immature male and female, collected by Mr. T. P. Austin at Cobbora, New South Wales, on 7th October, 1916 (see *Emu*, vol. xvi., part 3, p. 161).

The mature bird differs from typical specimens of *H. pyrrhopygia* collected near Sydney in being much paler above and below. The eyebrow is much whiter, the black centre of the throat and breast feathers is not so dark, and is more linear; the chestnut under tail coverts are broadly tipped with white, and the tips of the outer tail feathers are whiter and broader. This bird is also much larger than the typical *H. pyrrhopygia* collected near Sydney.

Habitat.—Cobbora, New South Wales.

Type specimens now in the H. L. White Collection, National Museum, Melbourne.

I propose that this race be scientifically known as *Hylacola pyrrhopygia magna*, and in the vernacular as Large Ground-Wren.

Publications Received Since April, 1917.

W. B. ALEXANDER, M.A., HON. LIBRARIAN.

[It is regretted that, owing to pressure on space, no contributions to the library were acknowledged in vol. xvii. of *The Emu*.]

Bird Lore, vol. xviii., No. 6; vol. xix., Nos. 2-6; vol. xix., Nos. 1 and 2.

Avicultural Magazine (3rd series), vol. viii., Nos. 1-12; vol. ix., Nos. 1-5.

Austral Avian Record, vol. ii., Nos. 4-8; vol. iii., Nos. 1-3.

Ibis (10th series), vol. v., Nos. 1-4.

Journal of the South African Ornithologists' Union, vol. xi., No. 2.

- South Australian Ornithologist*, vol. iii., Nos. 1-5.
British Birds, vol. x., Nos. 6, 8-12; vol. xi., Nos. 2, 3, 5-8.
Revue Francaise d'Ornithologie, Nos. 91-107.
Condor, vol. xviii., No. 6; vol. xix., Nos. 1, 3-6; vol. xx., Nos. 1 and 2.
Wilson Bulletin, vol. xxix., No. 4; vol. xxx., No. 1.
Auk, vol. xxxiv., Nos. 1-4; vol. xxxv., Nos. 1 and 2.
Papers and Proceedings of Royal Society of Tasmania for 1916 and 1917.
Proceedings of Royal Society of Queensland, vols. xxviii. and xxix.
Proceedings of Royal Society of Victoria, vol. xxix., Part 2, and vol. xxx., Part 1.
Proceedings of Linnean Society of New South Wales, vol. xli., Nos. 3 and 4; vol. xlii., Nos. 1-4.
Proceedings of the Academy of Natural Sciences of Philadelphia, vol. lxviii., No. 3, and vol. lxix., No. 1.
Victorian Naturalist, vol. xxxiii., Nos. 9-12; vol. xxxiv., Nos. 1-5, 7-12.
Proceedings of California Academy of Sciences, parts of vols. v., vi., and vii.
University of California Publications in Zoology, parts of vols. xiii., xv., xvii., and xviii.
Hawkesbury Agricultural College Journal, vol. xiv., Nos. 4-6, 10 and 11; vol. xv., Nos. 1-5.
Zoologist (4th series), vol. xx., Nos. 904-906 (now incorporated with *British Birds*).
Australian Naturalist, vol. iv., No. 2.
Australian Museum, Sydney, reprints of papers by the late A. J. North.
Australian Zoologist, vol. i., No. 5 (presented by H. L. White).

ARTICLES IN ABOVE PERIODICALS DEALING WITH AUSTRALASIAN BIRDS.

"The Birds of Dirk Hartog Island and Peron Peninsula, Shark Bay, Western Australia, 1916-17," by Thomas Carter, with nomenclature and remarks by Gregory M. Mathews. *Ibis* (10th series), vol. v., No. 4.

Mr. Carter records 38 land-birds and 17 sea-birds and waders met with on Dirk Hartog Island, and 32 land-birds and 20 sea-birds on Peron Peninsula. Dirk Hartog Island is of special interest as the type locality of the Black-and-White Wren (*Malurus leucopterus*) and the Grass-Wren (*Diaphorillas textilis*), which were discovered there by Quoy and Gaimard on the voyage of

the *Uranie* in 1818. Since that date no ornithologist had visited the island, and Mr. Carter was successful in obtaining specimens of both these birds. Six birds from Dirk Hartog Island and one from Peron Peninsula are described as new sub-species, including an Emu-Wren (*Stipiturus malachurus hartogi*), of which a coloured plate is given. A coloured plate is also given of the White-winged and White-backed Wrens, which the authors regard as being of the same species (*Malurus cyanotus*).

"Australian Parrots," by the Marquess of Tavistock. *Ibis*, vol. v., No. 4.

An interesting letter detailing differences observable in live specimens between the sexes of a number of species.

Avicultural Magazine: Anzac Number, vol. ix., No. 3.

This number is almost entirely devoted to Australasian birds. It contains the following articles:—"Notes on the Egg of Mantell's Apteryx," by Dr. G. Renshaw; "Notes on the White-browed Wood-Swallow," by R. T. Littlejohns and S. A. Lawrence; "Bird Talk," by An Old Australian Bird-Lover; and reprints of articles by the late A. J. North and of an article on "The Songs of Australian Birds."

"Birds in My Garden," by Henry L. White. *Australian Zoologist*, vol. i., No. 5.

Notes on the more interesting of the 104 species met with in the garden of "Belltrees," Scone, N.S.W., with observations on their habits.

"The Birds of the Cobbora District," by Thomas P. Austin. *Australian Zoologist*, vol. i., No. 5.

A valuable record of observations on the birds met with on the Cobborah Estate, N.S.W., during the past 17 years. In an area of about 9,000 acres Mr. Austin has taken the eggs of 122 species, has evidence of the nesting of 10 other species, and has records of 60 more, which are chiefly casual visitors. The article is illustrated by excellent photographs of nests of 16 species.

"Field Notes on *Acanthornis magnus* (Gld.), Scrub-Tit or Great Tit," by Edwin Ashby. *S.A. Ornithologist*, vol. iii., No. 1.

"Birds of the North and North-West of Australia, from Notes and Skins Made by the late Capt. T. H. Bowyer-Bower," by Gregory M. Mathews. *S.A. Ornithologist*, running through several parts.

"A Sketch of the Life of Samuel White—Ornithologist, Soldier, Sailor, and Explorer," by his son, S. A. White. *S.A. Ornithologist*, running through several parts.

"Further Notes upon the Arctic Skua (*Stercorarius parasiticus*)," by S. A. White. *S.A. Ornithologist*, vol. iii., No. 2.

"New Record for South Australian Waters—Finding the Flesh-footed Petrel (*Puffinus carneipes*, Gould)," by S. A. White. *S.A. Ornithologist*, vol. iii., No. 2.

- "Notes on *Ashbyia lovensis*," by J. R. B. Love. *S.A. Ornithologist*, vol. iii., No. 2.
- "Notes on *Amytornis merrotsii*," by J. R. B. Love. *S.A. Ornithologist*, vol. iii., No. 2.
- "Tasmanian Field Notes," by Edwin Ashby. *S.A. Ornithologist*, vol. iii., No. 3.
- "Notes on the Food and Temperatures of Cormorants," by A. M. Morgan. *S.A. Ornithologist*, vol. iii., No. 3.
- "Notes on the Mallee-Fowl (*Leipoa ocellata rosinae*)," No. 2, by T. P. Bellchambers. *S.A. Ornithologist*, vol. iii., No. 3.
- "Notes on the Little Black Cormorant (*Mesocarbo ater*, Lesson)," by F. R. Zietz. *S.A. Ornithologist*, vol. iii., No. 3.
- "Birds on the River Murray," by A. M. Morgan. *S.A. Ornithologist*, vol. iii., No. 4.
- "A Day in the Mallee," by F. E. Parsons. *S.A. Ornithologist*, vol. iii., No. 4.
- "The Grey-faced Petrel (*Pterodroma macroptera*, Smith)—A New Record for the South Australian Coast," by F. R. Zietz. *S.A. Ornithologist*, vol. iii., No. 4.
- "Birds of Port Broughton," by A. M. Morgan. *S.A. Ornithologist*, vol. iii., No. 5.
- "Birds Observed in the Neighbourhood of Pungonda, S.A.," by Edwin Ashby. *S.A. Ornithologist*, vol. iii., No. 5.
- "Additions and Corrections to my List of Australian Birds," by G. M. Mathews. *Austral Avian Record*, under various titles in several parts.
- "*Geopelia shortridgei*, Grant," by Tom Carter. *Austral Avian Record*, vol. ii., p. 108.
- Good evidence is given for the belief that this is a hybrid between *G. tranquilla* and *G. cuneata*.
- "Notes on Some Birds from the Kermadec Islands," by G. M. Mathews and Tom Iredale. *Austral Avian Record*, vol. ii., No. 5.
- "Plumage Changes of *Elseyornis melanops*," by G. M. Mathews. *Austral Avian Record*, vol. ii., No. 5.
- "Diggle's Ornithology of Australia and Other Works," by G. M. Mathews. *Austral Avian Record*, vol. ii., No. 7.
- "The Maned Goose (*Chenonetta jubata*)," by H. Wormald. *Avicultural Magazine*, vol. viii., No. 6.
- "My Moreporks," by An Old Australian Bird-Lover. *Avicultural Magazine*, vol. viii., No. 6.
- "Change of Colour in Blue Wren (*Malurus cyaneus*) as Affected by Seasons," by H. D. Astley. *Avicultural Magazine*, vol. viii., No. 5.

- "The Display of the Blue Wren (*Malurus cyaneus*)," by H. D. Astley. *Avicultural Magazine*, vol. viii., No. 7.
- "Mantell's Apteryx," by Dr. G. Renshaw. *Avicultural Magazine*, vol. viii., No. 12.
- "With the British Association in Australia," by A. H. Evans. *Ibis*, vol. v., No. 1.
- "Note on the Acclimatization of the Australian Black Swan (*Chenopsis atrata*)," by R. T. Gunther. *Ibis*, vol. v., No. 2.

ARTICLES OF GENERAL ORNITHOLOGICAL INTEREST.

- "Tail-Feathers and their Major Upper Coverts. H. L. Clark. *Auk*, vol. xxxv., No. 2.
- "Ferruginous Stains on Waterfowl." F. H. Kennard. *Auk*, vol. xxxv., No. 2.
- "The Description of the Voice of Birds." R. M. Strong. *Auk*, vol. xxxv., No. 2.
- "The Extraction of Fat from Bird-Skins." H. Lloyd. *Auk*, vol. xxxv., No. 2.
- "The Moults and Sequence of Plumages of the British Waders." Miss A. C. Jackson. *British Birds*, vol. xi., No. 3, continued in later numbers.

Several of the Waders common to Britain and Australia are dealt with, including Turnstone, Sanderling, Pratincole, Golden Plover, Grey Plover.

- "Development of Pattern in Birds," Dr. A. G. Butler. *Avicultural Magazine*, vol. ix., No. 5.
- "Photographs of Falkland Island Bird Life." R. H. Beck. *Bird Lore*, vol. xx., No. 1.

Includes photographs of several species familiar to Australasians, such as Black-browed Albatross and Giant Petrel, on their nests.

- "The Speed of Flight of Birds." Sub-Lieut. Aviator Guérin. *Revue Francaise d'Ornithologie*, No. 106.

Experiences of chasing Cormorants, Geese, and Ducks in an aeroplane.

- "Keeping Field Records." A. F. Gainer. *Wilson Bulletin*, vol. xxix., No. 4.
- "Reference List of Coloured Plates of the Parrots." Dr. E. Hopkinson. *Avicultural Magazine*, vol. viii., Nos. 3 to 6.
- "Are Birds Easily Deceived?" Dr. A. G. Butler. *Avicultural Magazine*, vol. viii., No. 4.
- "On the Species and Sub-Species of the Genus *Fregata*." G. M. Mathews. *Austral Avian Record*, vol. ii., No. 6.
- "Capacity in Nest Construction." Dr. A. G. Butler. *Avicultural Magazine*, vol. viii., No. 6.
- "An Improved Observation Tent." R. M. Strong. *Auk*, vol. xxxiv., No. 3.

- "A Study of Subsequent Nestings After the Loss of the First." H. Mousley. *Auk*, vol. xxxiv., No. 4.
- "The Shedding of the Stomach Lining by Birds, Particularly as Exemplified by the *Anatidæ*." W. L. M'Atce. *Auk*, vol. xxxiv., No. 4.
- "Notes on the Genus *Puffinus*, Brisson." H. C. Oberholser. *Auk*, vol. xxxiv., No. 4.
- "The Possibility of Using the Kerguelen Islands as a National Park for the Preservation of Antarctic Animals." A. Menegaux. *Revue Francaise d'Ornithologie*, No. 93.
- The action of the Tasmanian Government in refusing to renew licences to boil down Penguins on the Macquarie Islands is cited with approval, and the French Government urged to take similar action in regard to Kerguelen.
- "Some Factors Involved in the Nesting Habit of Birds." C. H. Kennedy. *Condor*, vol. xix., No. 3.
- "Results of the South Australian Museum Expedition to Strzelecki and Cooper Creeks, September and October, 1916: Aves. By S. A. White. *Trans. Roy. Soc. S.A.*, xli., 1917, p. 441.

A most valuable contribution to our knowledge of the birds of the interior of Australia. One hundred and six species were collected or recorded during the expedition. A new Tree-creeper (*Climacteris waitei*) discovered on the Cooper was described in *The Emu*, xvi., p. 168, and figured in vol. xvii., plate i., and an account of the finding of the nest of the Desert Chat was given in vol. xvi., p. 165. Captain White states that, with the exception of Bare-eyed and Rose-breasted Cockatoos and Shell Parrakeets, the paucity of bird-life in the region visited was remarkable, even though the season was an exceptionally good one. He attributes this to overstocking and the ravages of rabbits, together with droughts, which have largely destroyed the native vegetation, and he thinks there is no chance of its recovering its original condition. Most of the birds met with were such as are characteristic of arid regions, or of the water-holes of the interior. The Desert Chat (*Ashbyia lovensis*) and the Black-banded Whiteface (*Apheloccephala nigricincta*), previously only known from the region between Oodnadatta and the Macdonnell Ranges, were both met with, so that their known range is largely increased. It is somewhat surprising to find the names of three familiar sea-birds—the Caspian and Crested Terns and the Silver Gull—on the list of birds met with on the water-holes so far inland. Under the title "In the Far North-East," Capt. White has reprinted a popular account of the expedition contributed by him to the *Register*, and illustrated it with numerous photographs. This most interesting booklet will be read with much pleasure by all Australian ornithologists.

Nesting Notes from Moree

(40 MILES FROM QUEENSLAND BORDER).

BY F. C. MORSE, R.A.O.U.

DURING the months of August and September I examined fourteen Ravens' (Crows') nests, eleven of which contained five eggs, two four, and one six eggs.

On 1st September I noticed the first arrival of Wood-Swallows; these were the Masked variety. They are generally accompanied by the White-browed, but for some reason these latter did not appear. There are always some of the White-rumped and Common Wood-Swallows to be found here during the winter months. On the same day (1st September) I noticed one Pied Caterpillar-eater.

20th September.—Watched a Brown Tree-creeper dropping something down a hollow spout. She did not appear to be feeding young, so I climbed up and opened the hollow with my tomahawk. About a foot down there was the foundation of a nest made of grass, on the top of which was about a handful of kangaroo droppings, probably to give warmth. Many birds use dry manure for lining their nests, the White-browed Babbler in particular, but more so for the winter quarter nests than those for breeding purposes.

15th September.—Found three nests of the Tawny Frogmouth, none of which was quite complete. About here the clutch is almost invariably four eggs.

21st September.—First flight of Bee-eaters noticed.

29th September.—Found the nest of a Ground Cuckoo-Shrike; on climbing up, found three large young therein. Shortly after I found another with three fresh eggs.

1st October.—Found a Brown Hawk's nest, which was high up in a tall, straight belar tree (*Casuarina*). The nest contained two eggs. Attached to the bottom of the nest was a Yellow-tailed Tit's nest, with eggs, on which the little bird was sitting. It is a remarkable thing that these little birds should so often choose a similar place to nest. I wonder if it is for protection? On another occasion, on the Macquarie River, I found one nesting under a Sparrow-Hawk's nest, and a few days ago I noticed a Spotted-sided Finch flying with grass up to an Eagle's nest.

11th October.—Found a Striped Honey-eater's nest; to obtain it I had to attach a strong cord to the limb, which I then cut off and lowered to the ground. The little bird continued to sit on her eggs. The nest contained three fresh eggs.

Birds are nearly all robbers. The little Spotted-sided Finches' nests in the jacaranda trees in the garden are literally torn to pieces each year by "Blue-faced Soldiers," White-rumped Wood-Swallows, and many other kinds, to build their own homes.

On 13th October went with my two small boys to a swamp to see if I could shoot a Snipe. This is not a natural swamp, but is the terminus of a bore drain, and every year a few birds collect

there. The drain itself runs into a large tank about 60 yards square, and the sides are now overgrown with flags, in which the Reed-Warblers and Grass-Birds congregate. I was successful in getting six couple of Snipe, but the prize of the day was a Painted Snipe's nest, with four eggs. We also found one Pectoral Rail's, with seven eggs, and two Reed-Warblers'; also a Square-tailed Kite's, with two heavily-incubated eggs. During the week, while driving a mob of sheep, I noticed a Magpie-Lark fly from a Magpie's nest. Passing the same spot a week later, I saw the same thing occur. Curiosity got the better of me, and, although the nest was on the thin branches of a white-wood tree, I took the risk, and to my surprise found the bird, which builds a mud nest, was sitting on four eggs of her own. She did not seem to have re-lined or made any alteration in the Magpie's nest. As I was coming down the tree again I found a Spiny-cheeked Honey-eater's nest with two eggs.

20th October.—Found a Bell-Bird's nest with two eggs; nest was lined with sheep's wool and a few hairy caterpillars, and the rim was finished off with a beautiful lining of sheep's wool. A sheep had died a few yards away, from where, no doubt, the birds got the material.

27th October.—Paid another visit to the swamp. Succeeded in finding—or, rather, my dog did—three young Painted Snipe, unable to fly, close to where I had found the eggs a week before; also shot five more of the "Long-bills." The Painted Snipe must lie very quiet while breeding. As a rule they are not hard to flush; but in my two visits to this swamp I only saw one bird, while, on the evidence of nest and young, there must have been two pairs, unless the birds nest again as soon as the first brood is fledged. We also found three Pectoral Rails' nests and one egg of a Spotted Crake.

25th October.—Took a Narrow-billed Bronze-Cuckoo's egg from a Tit's nest. The birds had not finished building, and the Cuckoo's egg was slightly incubated. I make special note of this, as a Narrow-bill's egg previously taken from a Tit's nest was far further incubated than the Tit's eggs. A Pallid Cuckoo's egg, taken from a White-plumed Honey-eater's nest in the garden, which we were watching carefully (having seen a Cuckoo hanging round), was laid four days before the owners laid their first egg.

5th November.—Paid a third visit to the swamp, and found one Little Crake's nest with two eggs, also several nests of the Grass-Bird, all in polygonum bushes over the water. One had two large young; the other two were not quite built.

5th November.—Found the first Pied Caterpillar-eater's nest, also Sacred Kingfisher's; latter had five fresh eggs. Found several Pectoral Rails' nests; eggs scattered about, with small holes pecked in them, as if by some bird. Noticed a large flock of Starlings about. I wonder if they were the culprits? They have only recently appeared in these parts, and have not established themselves yet.

8th November.—Noticed large numbers of White-browed Wood-Swallows about, many of which started nesting a few days later.

12th November.—Found a Bell-Bird's nest in a low wild cherry tree, and many White-browed Wood-Swallows nesting in fence-posts and any available spot. Found Singing Honey-eater's nest; nest contained one large young Pallid Cuckoo, also a Honey-eater's egg, which was on the Cuckoo's back, and almost over the edge of the nest; also found Oriole's nest with three fresh eggs. During same week found four fresh eggs of the Kestrel, and found the shell of an egg of the Bustard; egg apparently recently hatched.

17th November.—Found the Mistletoe-Bird building: female doing all the work, while the male conducted her to and fro, singing all the while.

18th November.—Paid another visit to the swamp: found two Pectoral Rails' nests, also found a Grass-Bird's nest with three eggs.

24th November.—Found a little Peaceful Dove's nest and Barred-shouldered Dove's, both with eggs.

27th November.—Flushed a Horsfield Bush-Lark from nest of three eggs; near same spot, two days later, flushed Brown Song-Lark from a nest of two eggs. Both sets seemed fairly heavily incubated.

4th December.—Flushed Brown Lark from nest of three eggs; seemed quite fresh. Also found a Whistling-Duck's nest under a roly-poly bush, containing six fresh eggs. Previous year I found a Whistler's nest in the long grass with seventeen eggs.

7th December.—Found fresh egg of Pallid Cuckoo in a White-browed Wood-Swallow's nest.

10th December.—Found Little Dove's nest through the antics of bird in trying to attract me away; the nest had two fresh eggs in. Close by found a White-rumped Wood-Swallow nesting in a Magpie-Lark's nest. These birds nearly always make use of the deserted nest of the Magpie-Lark, after re-lining it to their own satisfaction.

16th December.—Found a White-fronted Heron's nest with four eggs, also a Little Dove's nest with two fresh eggs.

23rd December.—Found a nest of White-winged Superb Warbler with three eggs, also with one Narrow-billed Bronze-Cuckoo's.

23rd December.—While picnicking with the family near a creek a pair of Bower-Birds came to the camp and came within a few yards for crumbs, at the same time going on with the antics that these birds excel in; noticed they took the crumbs away in a certain direction, and after a little trouble we located the nest high up in a belar tree. I climbed up; nest contained two large young ones.

1st January.—Paid another visit to swamp; noticed many Reed-Warblers' nests with eggs and young. Also found several Plum-head Finches' nests in the long grass. Found one Little

Crake's nest with six eggs in, also several Grass-Birds' nests. Found the nest of Bald Coot, built on flags bent over; nest contained five eggs and two little ones just hatched. On approaching, the little ones jumped into the water, and tried to dive, but without much success—they could only get their little heads under. kick as they would. I got two rotten eggs; the remainder were just chipping. In the one green tree (coolibah) at the edge of the tank was the nest of a Square-tailed Kite. I noticed the shells of Duck eggs, and also a lot of down, lying about under the tree. One of the boys climbed up to investigate, and found a Duck had made use of the Kite's nest and had recently hatched.

6th January.—Noticed numbers of Bee-eaters flying about fairly high, as if preparing for migration. It may be the earlier broods getting their wings, as there are several nests near the house in which the young are still being fed.

8th January.—Paid a visit to a lagoon about 8 miles away; flushed a Darter from a nest in which were four ugly, long-necked young ones.

20th January.—Found White-winged Superb Warbler's nest with three Warbler's eggs and one Narrow-billed Cuckoo's; took the latter, which was quite fresh. Also found a Whiteface's nest, containing three eggs, in an old Finch's nest.

22nd January.—Found Singing Honey-eater's nest—one fresh egg; this is only the second specimen I have found. The bird itself is very rare here, and confines itself to small areas. The nests are difficult to find, being of scanty structure and built high up in the small branches.

23rd January.—On the way home from Garah my boys and I had a hunt through the grass for Quails' nests, and found the nests of three Little Quail, each containing four eggs, and also one Stubble Quail's nest with five eggs. Noticed many young Quail of both species in all stages of growth.

24th January.—While driving a mob of sheep I noticed a Painted Quail fly up from a salt-bush; on examining which, found a nest with four eggs.

28th January.—There are still some Bee-eaters about, but the majority have gone. I believe now the only ones remaining are the late breeders.

29th January.—Made a farewell visit to the swamp. Reed-Warblers still nesting freely; also found three Grass-Birds' nests, with eggs, but all heavily incubated.

30th January.—Found Little Dove's nest close to the house, with two eggs. A pair of Delicate Owls has nested for years in a large red gum tree near the house. I made one attempt to climb the tree, without success. These birds are said to hoot, but their call is a horrible screech, like a tenor White Cockatoo with a prolonged note. Every night through the nesting season, from August to January, the birds pass backwards and forwards over the house, making the most discordant noise, which is most disagreeable and alarming to any stranger. When I first came

here, seven years ago, we cleared a small area of ground, and in felling one tree, close to where the present nest is, a limb split open, which contained, for fully two feet, mould, and more particularly bones of small birds and mammals; there must have been thousands destroyed to form such an accumulation of bones, which were chiefly the jaws of small rodents and beaks of birds.

4th February.—Found a Mistletoe-Bird building. As on a previous occasion, I noticed the little female bird did all the work, encouraged by the melodious little twitter of her more gaily-dressed mate.

5th February.—Noticed a pair of what I believe to be Black-eared Cuckoos; have never seen these birds before. Most of the Wood-Swallows have disappeared during the previous fortnight, though I have not noticed them collect as they usually do before migration. The Bronze-Cuckoos and Pallids are still about, but the Fantails have been absent for the whole of the summer. I cannot help thinking that these birds winter here, as I have noticed many of them in the depths of winter in the big belar scrubs. About July one could see 20 or 30 birds in half an hour's ride, but they all go away for the summer. The Pallid Cuckoo is here all the year, but the Bronze leaves us in March, and does not appear till the following spring.

Have been carefully watching all the season for another set of Owlet Nightjar's eggs with the black markings. The bird did not come back to the same hollow to nest. I have been unable to find a Nightjar's at all this season, although we can hear the little birds calling every night close to the house.

10th February.—*Merops ornatus*.—Took a young Bee-eater from its nest to photograph it. The nest had a fortnight earlier (when the little ones were just hatched) been broken in by a horse; we noted the occurrence, and built a roof of boards over the tunnel. I have done the same thing on several previous occasions, and have never known the birds to desert their young, though our construction was very different from the original.

12th February.—*Dicaeum hirundinaceum*.—Found a nest of the Mistletoe Swallow containing three fresh eggs; just recently have noted several of these little birds getting material for building.

12th February.—*Ptilotis sonora*.—Found a Singing Honey-eater's nest with two eggs. I often wonder why these birds are designated "Singing." Their notes are few and far between—one a "Preet, preet, preet," which is a call to its mates; another a plaintive little mew, something like that of a kitten; and another of two notes, which I never heard during the breeding months. Their food is chiefly gathered from the mistletoe blossoms, and, although they can be heard from the house, I never knew one to touch fruit in the garden.

Turnix velox.—Last week I brought home a Little Quail, the young of *Turnix velox*—a tiny thing not larger than the joint of one's thumb. For the first afternoon it would not eat, but next

day was tempted to try a fly, after which it developed a most voracious appetite for *insects only*. We tried it with grass-seeds, bread crumbs, oatmeal, biscuit, various berries, and all manner of things that one would imagine a Quail might like, but it would have nothing except insects and spiders. It delighted in large brown-and-green blow-flies. It kept my family going all day in catching food for it. On the second night of its captivity I caught 18 earwigs, each about half an inch long, all of which it ate next morning in a few minutes, and in a quarter of an hour it was just as hungry as ever. It must have eaten more than its own weight of insects each day. After the fourth day its little life was cut short by getting itself under someone's foot. There are thousands of these Quail about, and I presume all have appetites similar to the one in question. What a bearing they must have on the insect pest—perhaps, too, on the blow-fly, which has cost the country so much money! It would be quite simple for the birds to get the flies in the early mornings; and it is a striking fact that this year the fly trouble with the sheep in these parts has been practically *nil*, while last year the loss was enormous. The season in all respects seemed to favour the fly, and at the same time the Little Quail were much more numerous than I have ever known them to be.

11th March.—*Notophox* *pacifica*.—Found a large colony of White-necked Herons nesting in the big red gum trees on the Barwon River; the young were flying or standing on limbs near the nest. There was also a pair of Black-billed Spoonbills (*Platalea regia*) with a nest among the Herons.

28th March.—*Strix delicatula*.—The Delicate Owls that have been within earshot of the house since August have suddenly disappeared, and the absence of their horrible screech is most marked. These birds come here every spring to breed, and disappear during the winter months. Their departure now cannot be influenced through want of food, as the whole country is overrun with mice. Strange to relate, the Quail have also all gone—not only from here, but the whole district reports the same thing. I believe the Quail have been driven away by the mice, which have eaten up everything.

23rd March.—Was on an island off the New South Wales coast, where Mutton-Birds and the little Blue Penguins breed freely. Up the gullies, under fallen palm leaves, we found some young Petrels, and also some mature birds, caught in the *Pisonia* seeds. I believe these belonged to the genus *Æstrelata*. We took one of these on board our boat and fed it for two days on pieces of garfish, and, although when found it was very weak, the fish diet strengthened it so much that we were able to liberate it. I was struck by the way the bird used the hook of its bill; it was continually trying to climb out of the boat by hooking on to anything in reach, and made me think they must use their bills largely for climbing into the rocky situations in which the eggs are laid, flight there being impossible owing to the density of the foliage.

24th March.—Paid a visit to another small island of about

15 acres, 3 miles from the mainland. There are no trees, but the surface is fairly flat and covered with coarse grass and reeds. Every square foot is utilized by Mutton-Birds. We also flushed a number of Brown Quail. The only other land-bird was the Australian Pipit (*Anthus australis*). There does not appear to be much animal life, but we noticed many small brown lizards.

3rd April.—Returned home, and on 5th noticed a flight of Bee-eaters making north.

12th April.—*Zosterops*.—Numbers of Silver-eyes have come about; never saw these little chaps so far inland before.

20th April.—*Artamus superciliosus*.—Large flight of White-browed Wood-Swallows passed over to-day, apparently going south-west.

25th April.—Heard an unusual disturbance among the birds in a sandal-wood tree. On investigating found a brown snake's skin hanging from the branches; evidently it was carried there by a whirlwind. Round it, in great consternation, were "Jacky Winters" (Australian Brown Flycatcher), Rufous Whistlers, Yellow-tailed Tit-Warblers, Little Tit-Warblers, some "Soldier-Birds" (Noisy Miner), and "Razor-grinders" (Restless Flycatchers).

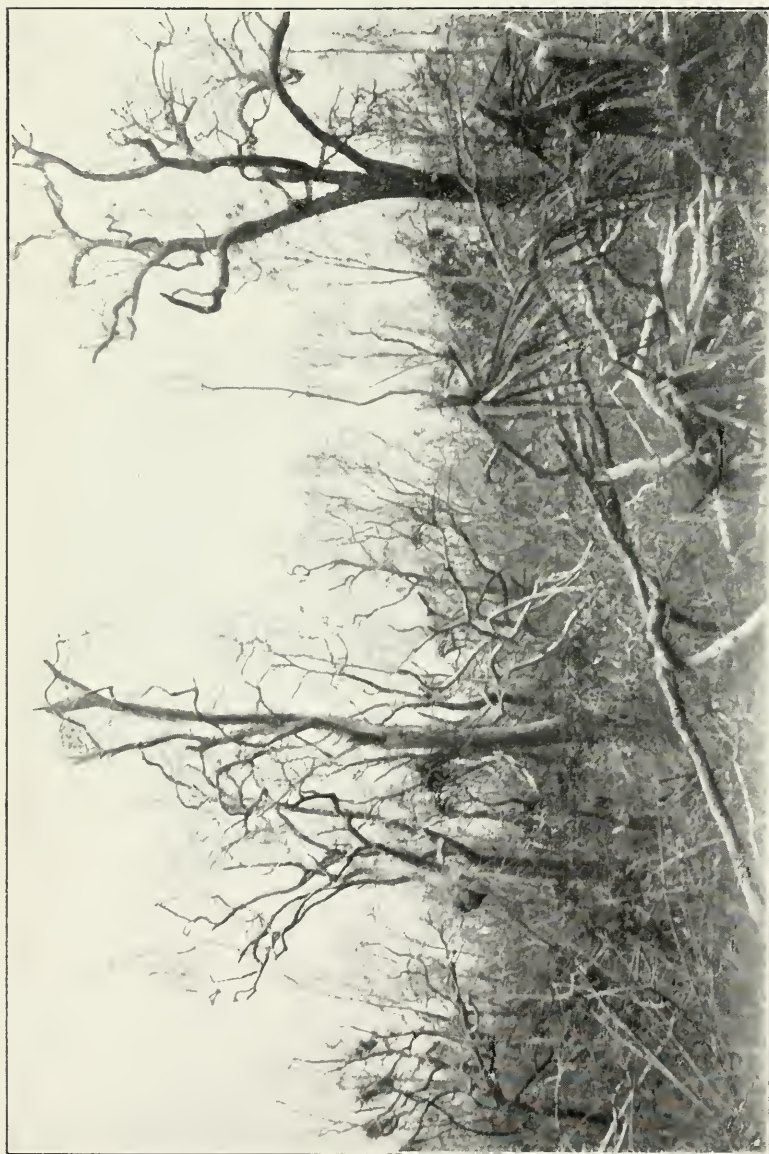
4th May.—Emus are now in pairs everywhere in these parts; we are always on the look-out for fresh eggs this month. Listening to one of Mr. Le Souëf's interesting lectures reminded me of an old male Emu. Living by himself in the hills, far removed from any of his kind, he has each year, for many years, gone to the rubbish heap and got together about a dozen bottles, on which he used to sit for some weeks. This happened every year for eight years to my knowledge, and I don't know how long after.

6th May.—Was witness of a funny incident yesterday. Great Brown Kingfishers come every morning for the mice thrown out of the traps. One got his mouse and flew with it to the limb of a tall, dead gum-tree. Another laid claim to the same mouse, and flew up and grabbed the other end. They both sat back and pulled. We watched them for a few minutes, then went in to our own breakfast, leaving them still steadily pulling. Fifteen minutes later they were still in the same position, but had been joined by five others, which were watching the contest with apparently much interest. No. 1 then made a mighty effort to get the mouse, overbalanced, and fell off the limb; but in spite of this he still hung on, and spun slowly round and round under the limb with wings tightly closed. The strain was too great, and he had to let go, at which the five spectators threw up their heads and laughed heartily. However, the defeated one bore no malice; he joined the others on the limb and joined in the merriment.

The mice do not only provide food for "Jackasses." Two very large green frogs live in our back skillion. Hearing an unusual scuffling in the onion-box the other night, we went out with a light, just in time to witness the larger frog getting a mouse down its throat.

Cyclones and Bird Destruction.

THIS year cyclones in North Queensland were unusually violent, the one at Mackay—at its height the night of 20th-21st January—being a record for fierceness and widespread damage, in which much avifauna was wiped out. Mr. E. M. Cornwall, although himself heavily hit by the great storm, kindly sends the accompanying photograph of a portion of his bush paddock and bird sanctuary, with the following note:—"The destruction of bird-life has been deplorable. Thousands of sea-birds were driven ashore; amongst them were Frigate-Birds, Gannets, and Caspian, Brown-winged, Crested, Lesser Crested, Black-naped, Roseate, and Noddy Terns. Thousands of these were lying dead along the beaches. I found some in my paddock amongst the drift which the tidal wave swept up to my garden back fence. Our forest birds are almost wiped out. We have not seen a single Honey-eater of any kind since the storm, and those birds we have seen could be counted on the fingers of one hand. At Mrs. Innes's place the Parrots flocked into the house, and, though the roof went off, they remained there until the storm was over." The illustration shows how completely the foliage has been stripped, by the force of the wind, off the trees, which were acacias (two kinds), melaleuca, eucalyptus, careya, &c. Regarding another cyclone at Cardwell the night of 10th-11th March, a correspondent, Mr. Tom Butler, J.P., after mentioning destruction of his own property, loss of local stock, two aborigines killed, and the appearance of the scrub after the blow—"like those illustrations you see in the papers of a forest in France that has been shelled"—writes:—"I think the birds in the scrub (really a green jungle) are nearly all wiped out. Most of them would be killed, and the fruit-eaters would have to leave or starve, there being nothing for them. A few birds strange to me came round the premises looking for food. White-eyes (*Zosterops*) came in great numbers after the fallen oranges (nearly all the orange crops came to the ground). The poor little chaps were starving, and so weak they could not fly. Others made a raid on 'Joeys' (Blue-bellied Lorikeet) milk pots—in fact, were all over the place hunting for food. Our tame Pigeon (Magnificent Fruit-Pigeon) was away that night; do not know where he got to, but he returned home next morning a complete wreck, and was apparently so disgusted that he rarely leaves home now. You remember how tuneful the numerous birds used to be in the adjacent scrubs at early morn. Since the blow there has been a dead silence—not a sound of any sort. Even the Megapodes do not sing out." The destruction of beautiful bird life by these fierce visitations of Nature must be enormous—temporary extinction in some parts. Therefore, as a mere drop of water in a bucketful must be the few specimens taken by the hand of man from time to time for museum and scientific purposes, to which there is sometimes objection taken by over-zealous persons.—A. J. CAMPBELL. Surrey Hills (Vic.)



A Queensland Forest after the Great Cyclone. The trees are stripped of foliage.

PHOTO. BY E. M. CORNWALL, R.A.O.U., MACKAY.



Albino Magpie (*Gymnorhina leuconota*).

PHOTO. BY D. LE SOUEF, C.M.Z.S.



Flight of Galahs (Rose-breasted Cockatoo).

PHOTO. BY F. C. MORSE, R.A.O.U.

In the recent cyclone which took place at Mackay, on the coast of North Queensland, the damage done to the small bird-life can hardly be realized. Probably many thousands of birds have been killed. The following note from our member, Mr. E. M. Cornwall, will give a little idea of the havoc wrought:—"One of the saddest features of the storm is the loss of bird-life. The deadly stillness of the bush is to me simply awful. Lying round about my place there are a pair of Leach's Kingfishers (*Dacelo leachi*), a pair of Koel Cuckoos (*Centropus phasianus*), two or three Crows (*Corvus coronoides*), and one Black Butcher-Bird (*Cracticus quoyi*). All the hundreds of Honey-eaters, &c., that were in the habit of coming into the garden are utterly gone; the Doves, which used to come into the yard and feed with the fowls, are also gone, and I fear greatly that it will be a long, long time before we shall see the fluttering wings and hear the cheerful twitter and whistle of our little friends again. You will be glad to know that my collection did not come to grief. When the house came down, with the piles on which it stood, it fell so gently that we barely felt it; the roar of the cyclone drowned all the noise of falling, and not one single egg in my cabinet was out of place." Another member, Mr. W. G. Harvey, states that, "sad to relate, the birds and beasts are nearly all gone, and, as the country has been devastated for about 100 miles on either side of Mackay, I fear that it will be some years before we can hope to have a full complement of birds in our district."—D. LE SOUËF, C.M.Z.S.

Stray Feathers.

Flight of Galahs.—The accompanying photograph was taken in 1910 by Mr. F. C. Morse, R.A.O.U., at a place 35 miles north of Maxwellton, on the Townsville-Cloncurry railway, North Queensland. The Rose-breasted Cockatoos or Galahs (*Cacatua roseicapilla*) are nomadic, and appear at times in immense flocks.

* * *

Albino Birds.—It is interesting to notice the albino phases of some of our birds. In Parrots, for instance, where the red never changes, the green becomes yellow and the blue white; green and blue are both composite colours. In other birds that are shades of black and white the bird becomes pure white, as, for instance, the Emu, Crow, Magpie, Eagle, Hawk, &c. I have never yet heard of a white Bower-Bird, but in any case albinos of any birds are very rare, and, being conspicuous, may soon be killed by birds of prey. A white Magpie often has trouble in securing a mate; the other birds of his kind evidently do not recognize their companion in his new dress. An albino Eagle we had for some years occasionally grew an ordinary-coloured

feather, and the white Emu in the Sydney Zoological Park has now grown several feathers of the natural colour. The albino Magpie in the illustration belongs to our member, Miss S. M. Robertson, of Mordialloc. It has the run of the garden.—D. LE SOUËF. Melbourne.

* * *

Freckled Duck.—The Freckled Duck (*Stictonetta nœvosa*) is fairly plentiful on our lakes this season. I had one brought to me for the table last week, and it proved excellent eating. The very compact plumage resembles that of the Musk-Duck. Sportsmen have never seen the bird in this locality before.—A. TREZISE. Robe, S.A., 14/6/18.

* * *

Quail and Mice.—A strange thing has happened in these parts lately. A month ago the whole country was alive with Quail, both Stubble (*Coturnix pectoralis*) and Little (*Turnix velox*), but in a few weeks they were gone almost to a bird. I believe the reason is mice. These little rodents have run over the plains in countless swarms, and probably eaten all the grass seed; there are still heaps of dry grass, but no seed.—F. C. MORSE. Garah, N.S.W.

* * *

Cuckoo and Mice.—I secured a male Coucal (*Centropus phasianus*) the other day, and I was surprised on opening the stomach to find two partly digested and one fresh mouse and the remains of a grasshopper. This bird swallowed the mice whole, there being no sign of their having been torn to pieces in any way. I have not seen any of these birds about here before. I secured the bird on the edge of a thick brigalow scrub which was thickly infested with prickly pear. Has there been previous evidence of this bird eating mice?—N. GEARY, R.A.O.U. Mount Pleasant, Dalby (Q.), 19/5/18.

* * *

Hungry Honey-eaters.—For some unexplained reason the bush does not seem to be producing sufficient food for the Honey-eaters at the present time, as far as the vicinity of Hobart is concerned. Although my home is within two miles of the G.P.O., I am deriving great pleasure owing to my garden being graced with the presence of numerous *Meliphagidæ*. There are nearly always a few Crescent Honey-eaters (*Lichmera australasiana*) in the garden, but in addition, at the present time, I notice Yellow-throats (*Ptilotis flavigula*), New Hollands (*Meliornis novæ-hollandiæ*), and an occasional Spinebill (*Acanthorhynchus dubius*). The latest arrival, however, is no less than the Wattle-Bird (*Anthochaera inauris*). This is the first time that I have seen a Wattle-Bird so close to the city for many years. The main object of their visit appears to be to feed upon a few apples that have been left on the trees, these being now almost over-ripe.—CLIVE E. LORD. Hobart, 27/5/18.

“Rooks Killing Sheep.—Damage in Hawke’s Bay.—Farmers in Hawke’s Bay are complaining of depredations of Rooks among their flocks. The Rooks have acquired the habit of attacking not only lambs, but full-grown sheep, and the losses in some parts of the district are becoming serious. The birds attack the flocks not only in the daytime, but also during moonlight nights, and one farmer near Farndon has lost scores nightly. The Rooks attack the throats of the sheep, and numbers can be seen in the paddocks with open wounds. One was seen with its head completely severed with the exception of the spinal column. The birds also eat the flesh right down the middle of the back, rendering the skin quite useless. As the Rooks are protected, the position is serious in some parts of the district. Representations are being made to the Government on the subject.” The above paragraph cutting is from the *Auckland Weekly News*, and may be of some interest as showing some of the troubles of an Acclimatization Society. —Communicated by Dr. T. J. ICKHEWINS. Manaia, Taranaki, N.Z., 9/6/18.

* * *

Birds and Caterpillars.—The interesting observations by Mrs. Adam Black, of Charters Towers, on the “fearsome manner” in which young Gouldian Finches open their mouths and wag their heads when disturbed,* calls to mind the following note on the young of *Gerygone personata*, which occurred in one of Dr. Macgillivray’s valuable papers † on the birds of North Queensland:—“The young birds have four peculiar head-plumes, which they have the power of erecting and quivering vigorously. When one looks into a nest these head-plumes are put into motion by the birds, and remind one of a number of caterpillars waving about.” These notes are the more interesting to me in the light of a recollection I have of a similarly curious experience with a pair of baby Bell-Birds (*Oreoica cristata*). Wandering through a bush recess in the vicinity of Maryborough (Vic.) on a day in October of 1912, I chanced upon these two squatting in a nest on a bushy stump. They were altogether uncanny-looking objects. Though almost fully fledged, the tops of their heads and a patch right down their respective backs were quite free of feathers, and instead of the usual wide-eyed stare of inquiry the visitor gets from most young birds, the eyes were tightly closed. Both babes, in fact, might have been quite devoid of life; but when I touched them lightly there was a decided change of tactics. The eyes remained closed, but the necks were outstretched, the sprouting feathers on the foreheads started, and the heads waved in exactly the threatening manner of the tails of processional caterpillars. Meanwhile, the old birds kept

* *Emu*, vol. xvii., p. 228.

† *Emu*, vol. xiii., p. 166.

severely away from the nest. In half an hour's time I stole a march on the young actors, and found them sitting up complacently, with eyes wide open! Immediately, however, these were closed again, and the uncanny mimicry (?) of caterpillars was vigorously resumed.

Is there, one wonders, any affinity between this queer process and the Bell-Birds' habit of storing their nests with caterpillars? Of dozens of these homes examined, I do not recollect one that had not its complement of caterpillars, usually the larvæ of *Darala ocellata*. Sometimes the insects were on the rim of the nest; sometimes they were under the brooding bird or beneath the young ones: sometimes they were obviously dead; sometimes they were alive, but sluggish; and sometimes they appeared to be petrified. I saw no indications of the caterpillars being used as food,* and the only theory presenting itself was that the birds gathered them for the same reason as the young Bell-Birds wave their heads—defence purposes. Can anything better be offered? An interesting observation upon the subject is given by Mr. G. F. Hill in his "Ornithological Notes on the Barclay Expedition of 1911-12,"† wherein he remarks that he was surprised to find Bell-Birds in the Northern Territory using a species of caterpillar (*Spilosoma*, sp.) closely related to *Spilosoma obliqua*, which he has noted to be much favoured by Victorian Bell-Birds. The matter was discussed also in early issues of *The Emu*, but no definite conclusions arrived at.—A. H. CHISHOLM. Brisbane, May, 1918.

Correspondence.

To the Editors of "The Emu."

DEAR SIRs,—In the issue for October, 1917, page 108, it is stated that I express doubt in reference to the Pacific Gulls dropping "Warrener shells" to break them and extract the contents. It was my old friend Dr. A. M. Morgan who doubted the above, and I brought evidence to bear in my article which appeared in *The Emu* to substantiate my contention that the Gulls do drop the shells. I would like to know what evidence caused Mr. Le Souëf to be "satisfied the Pacific Gull does drop the shells to break them." Not by personal observation, I should think.—Yours truly,

S. A. WHITE.

"Wetunga," Fulham (S.A.), 22/11/17.

* Mr. Charles Barnard, in "Nests and Eggs" (Campbell), makes the sound point that the caterpillars usually gathered by *Oreoica* seem altogether too hairy to be used as food by the birds. This observation applies particularly to caterpillars of *Darala* and *Spilosoma*.—A. H. C.

† *Emu*, vol. xii., p. 258.



The late Colonel W. V. Legge, C.M.B.O.U., first President R.A.O.U.

About Members.

MR. G. M. Mathews, F.R.S. Edin., has been elected a member of committee, British Ornithologists' Union, in place of Mr. D. Seth-Smith, F.Z.S., who retired by seniority. Although Mr. Mathews resides in Britain, he is the first Australian (by birth) elected on the committee of the venerable B.O.U.

* * *

CAPT. S. A. White, R.A.O.U., South Australia, has been elected a "Colonial Member" of the British Ornithologists' Union—a coveted prize, as only ten living overseas ornithologists can hold that distinction at one time. Capt. White is to be congratulated accordingly.

* * *

OUR member and keen-sighted observer, Private Les. G. Chandler, has been slightly wounded (gassed) in France, where he has been for over two years. Fellow-members will sympathize with him in his temporary disablement. Sympathy is also extended to his parents, Mr. and Mrs. R. C. Chandler, of "Maloort," Frankston, with the hope that their good son will soon return to his humanitarian duties in the Field Ambulance Corps.

Obituary Notices.

LEGGE.—On the 25th March, 1918, at his residence, "Cullenswood House," Cullenswood, Colonel W. V. Legge, late Royal Artillery, in his 78th year.

THE late Colonel Legge, ex-Commandant Tasmanian Defence Forces, had a distinguished and useful career. He was born at Cullenswood, which is near St. Mary's, Tasmania, during "yellow-haired September," 1841, his father, the late Mr. R. V. Legge, being one of the earliest settlers in Eastern Tasmania.

Young Legge was destined for the army, and proceeded to England with his parents at the age of 12, and crossed the Isthmus of Panama on mule-back. He was educated chiefly at Bath, also in France and Germany, and was a most proficient linguist, having taken the prize for German at the Royal Military Academy at Woolwich (which he entered as a cadet), and was beaten only in French by a cadet of French extraction. In 1862 he received his commission, and served first at Dover Castle with the garrison, then was transferred to Melbourne, where he was stationed with his battery (No. 7 of the 2nd Brigade) during the Duke of Edinburgh's visit. He was in charge of the detachment which fired the royal salute on the Duke's arrival in Port Phillip,

1867. From Melbourne his battery was transferred to Colombo, and he remained in Ceylon for nine years, where his family of three was born. On his return voyage to England he was wrecked in the Red Sea. In order to the better carry on the work of his book ("The Birds of Ceylon"), he took a staff appointment at Aberystwith, in Cardiganshire, which he held for about five years, and was next offered by the then Commander-in-Chief, the Duke of Cambridge, the most coveted appointment of all artillery officers—namely, inspector, or instructor, of experimental gunnery. Owing to his father's failing health he refused this, even when offered lengthened furlough to pay his parents a visit. Col. Legge had also experience as an engineer officer, and supervised the construction of some of the Portsmouth forts. Latterly he was for 11 years Commandant of the Tasmanian military forces, and after the Boer War was retired on reaching the age limit. He then took to pastoral pursuits.

Colonel Legge's hobby was natural science—forestry, physiography, with a strong leaning towards ornithology. He was one of the founders and first president of the Royal Australasian Ornithologists' Union.* His *magnum opus* was "The Birds of Ceylon," two large volumes, quarto size, illustrated with coloured plates by the best artists of the day. The work is still a standard one, and in our library the two handsome books are inscribed, "Presented to the R.A.O.U. by its first President—The Author." In 1887 he published a useful "Systematic List of Tasmanian Birds." Col. Legge was rather a "lumper" than a "splitter." In his introductory note he states:—"There has been an unnecessary separation of genera in many families of Australian birds. Nothing is more perplexing to the young student than this, and I have, in cases where there are no differences of external structure, discarded many such genera."

At the Hobart meeting (January, 1892) of the Australasian Association for the Advancement of Science, Col. Legge contributed an important paper, "On the Geographical Distribution of the Australian *Limicolæ*." The paper dealt with 46 species, grouped under their respective families. He inadvertently omitted the Sanderling, but included the Little Indian Ringed Plover (*Ægialitis jerdoni*), as he believed it to be the second species (or sub-species) found in the Papuan Region, and no doubt also on the contiguous coast-line of Northern Australia.

Col. Legge took a prominent part in the compilation of the "List of Vernacular Names for Australian Birds,"† which was presented at the Sydney session of the A.A.A.S., 1898. He made several special trips across the Strait for the purpose of conferring

* His comprehensive address on "Current Australian Ornithology" appears in *Emu*, iii., pp. 142-155, and probably his latest written and interesting note, "A New Raptor for Tasmania," may be seen in the last volume (xvii.) of *The Emu*, pp. 103-105.

† Popularly known as the "Yellow List," on account of the colour of its wrapper.

with the more centrally situated fellow-members of that committee

Because of his extensive ornithological knowledge in both northern and southern hemispheres, Col. Legge will be much missed at the deliberations of the R.A.O.U. "Check-list" committee, of which he was an original member. His ripe judgment was exceedingly useful to the committee of the present official "Check-list." When debating points or examining specimens younger members in experience often came to a quicker decision, but it was characteristic of the Colonel that in the execution of any duty he was conscientious to a degree, and never gave a decision without due consideration of every side of the question.

Colonel Legge and the late Dr. Bowdler Sharpe were firm friends, and the former frequently, when in England, visited John Gould, the "Father of Australian Ornithology." Possibly the passing of the Colonel has severed the last living link between members of the R.A.O.U. and the great "Pictorial Ornithologist," who, by common consent, has benefited Australian ornithology more than any other author, past or present.

Colonel Legge was a Colonial Member of the British Ornithologists' Union and a Honorary Fellow of the American Ornithologists' Union.

Even to those who knew him best there was an amount of modest or natural reserve about the personality of our deceased member. His Christian-like courtesy was perfect, as was his gentlemanly demeanour at all times and in all places.

Two sons (Mr. Vincent Legge, Victoria, and Mr. Robert Legge, Tasmania) and his widow (by second marriage) survive him, to whom all members of the R.A.O.U. respectfully extend their most sincere sympathy.

A TASMANIAN TRIBUTE.

The death of Colonel Legge will make a gap hard to fill in the ranks of Tasmanian ornithologists. For many years he has always contributed the ornithological notes to any special handbook or special meetings of scientific men concerning the natural history of our island. He was a frequent contributor to the papers and proceedings of the Royal Society of Tasmania, and his papers (numbering seventeen) are mainly concerned with ornithology.

It may not be generally known that the splendid collection of skins that Col. Legge made in Ceylon while engaged on his classic history of the birds of that island are in the Hobart Museum. Strange to say, it was only a few days before news was received of his death that I had the privilege of re-arranging the whole of this splendid collection. This was presented to the Museum in 1902.—CLIVE E. LORD.

THE LATE GUNNER M. C. THOMPSON, R.A.O.U.

GENERAL and sincere regret will be felt by all members of the R.A.O.U. at the loss of a young and promising naturalist, Maurice Charles Thompson, son of Mr. and Mrs. W. G. Thompson, of "Pambula," Moreland. Gunner Thompson fell in France on 29th April last, and, as heroes do, facing the foe on the Lys River, where the British, fighting hard, thrust the horrible Huns back apace.

The late gallant gunner, who was formerly in the Auditor of Receipts Office, Victorian Railways, was only 25 years of age, was born at Ascot Vale (Vic.), and was educated at the Moreland State school. He enlisted July, 1915, and was in the thick of the fighting for over two years in France. He will be remembered amongst members for his well-nigh faultless and lovable disposition. As a bird-lover and in the field he lived near to Nature's own great heart, and consequently was a keen observer. On service he was very fond of reading *The Emu*, and, when digested, he always returned his copy home for safe keeping. The following extract of stern duty and bird-observing is taken from a letter of Gunner Thompson's, written to a fellow-member, Mr. A. C. Stone, under date France, 24/4/17:—

"We had some interesting though strenuous times lately following Fritz through and far beyond Bapaume. The most exciting time (which has since been well described in the papers) was one morning, when I had an unpleasant awakening. Just before dawn a chap came running past our dug-outs with the pleasant news that Fritz was advancing in force just over the rise. We were soon told to retire to the next village, as our infantry was falling back. The breech-blocks, &c., were removed from the guns, as the latter could not be used under the circumstances. Machine gun and rifle bullets were pretty thick, and the shells were falling in the fields, but not so thickly. At first I thought I would soon be mending Fritz's roads. It was something new for us. Finally, as you now know, Fritz got a terrible mauling.

"The weather to-day is glorious. What a wonderful difference it makes to us! It is good to be alive. The Larks are singing beautifully, and to-day I saw the first Swallow this season. The Magpies (*Pica pica*) are building in a small wood not many miles from here. I saw about one hundred of these birds one evening. The Partridges are going about in pairs now. There are a fair number of what I take to be Linnets, and a few tiny Hawks which somewhat resemble our Kestrel in habits. The only other 'birds' that are at all common hereabouts are aeroplanes, of many different species. It must be the 'mating season' for them too, as I often see them fighting fiercely."



THE STRIATED GRASS-WREN
Amytornis striata

The Emu

Official Organ of the Royal Australasian Ornithologists' Union.

"Birds of a feather."

VOL. XVIII.]

1ST OCTOBER, 1918.

[PART 2.]

Striated Grass-Wren (*Amytornis striata*, Gould).

BY A. J. CAMPBELL, C.M.B.O.U.

THERE is possibly sufficient material in the "H. L. White" and National Collections, Melbourne, to enable students to review the geographic range and colour variation of this species.

The dullest (hazel) phase appears to be the extreme eastern birds—Mallee (Victoria) and New South Wales (type locality)—while the richer-coloured (bright auburn or Sanford's brown) phase extends northward and through the great interior to western West Australia.

Of the extreme eastern birds, the true *striata* might be united with *howei* (Mathews), which is stated to differ from the former in "being red-brown above and in having the white shaft-streaks bordered by a line of black" (*Bull. B.O.C.*, xxvii., p. 100).

A pair (♂ upper fig., ♀ under fig.) of *howei*, the subject of the coloured plate, is from the "H. L. White Collection," National Museum. Gould's plate ("Birds of Australia," vol. iii., No. 29) more assimilates the richer-coloured interior form.

There is less variety among the rich auburn headed and mantled birds, which apparently come under one group, namely:—*rufa* (Campbell and Kershaw), interior of Northern Territory (*Emu*, xii., p. 274).

oweni (Mathews), interior of Western Australia (*Bull. B.O.C.*, xvii., p. 48).

whitei (Mathews), Mid-West Australia (*Bull. B.O.C.*, xxv., p. 34).

Therefore, we can, in *Amytornis striata*, recognize generally two forms, or races—*striata* proper (Eastern) and *whitei*, the more auburn phase (Interior and Western). Nestlings of the two forms can likewise be separated.

Interesting field observations on *A. striata* will be found in *The Emu*, vol. ix., by Messrs. F. L. Lawson (W.A.) and F. E. Howe (Vic.) respectively on pages 204 and 232.

Dimensions in mm. :—

Eastern—Length 160–170, wing 61, tail 80–85, tarsus 23, culmen 10.

Central—Length 165, wing 62, tail 89, tarsus 22, culmen 12.

Western—Length 165, wing 60, tail 80, tarsus 22, culmen 13.

Amytornis merrotsyi, Mellor (*Emu*, xii., p. 166), from South Australia, appears to be a robust variety of *striata*—probably a distinct species; it is not a sub-species of *textilis*, as indicated by Mathews in his "1913 List," p. 232.

"What are Australian Petrels?"

BY GREGORY M. MATHEWS, F.R.S.E., FOULIS COURT, HANTS.,
ENGLAND.

IN my "Birds of Australia" I devoted much space to the elucidation of the species of Petrels found in Australian seas. I then found, in the course of my investigations, that species were regarded as Australian upon the authority of Gould's inclusion of these in his works. It is necessary to recall that Gould made a special study of these birds upon his voyage out to Australia, and that he concluded that these birds had immense ranges on account of their power of flight. These views have since been modified, and it is now becoming recognized that while there may be wanderers even as in other groups, as a rule the birds of this order are more or less local in their habits. Other factors are the nocturnal habits of many species, and their custom of breeding on isolated islets, often almost inaccessible.

In my "List" I included most of the recognized species, but I recorded that I had already rejected three—viz., *Procellaria mollis*, *Procellaria cookii*, and *Diomedea albatrus*.

Recently I have gone into the records of many of the other species, with astounding results—viz., that I can trace no authentic records of the following series:—*Fregettornis grallarius*, *Puffinus assimilis assimilis*, *Reinholdia reinholdi huttoni*, *Procellaria æquinoctialis steadi*, *Procellaria conspicillata conspicillata*, *Priofinus cinereus*, *Pterodroma macroptera gouldi*, *Diomedea exulans chionoptera*, *Diomedea epomophora epomophora*, and *Phæbetria palpebrata huttoni*.

There appears to be only one authentic record of *Fregetta tropica*, *Procellaria parkinsoni*, *Pterodroma melanopus*, *Pterodroma inexpectata thompsoni*, and *Thalassogeron chrysostoma culminatus*.

Such a sweeping series of rejections needs explanation, so before entering this phase I would point out that my object in writing this note is to draw attention to this matter, so that definite records may be brought forward. At the present time no authentic records exist, but that does not mean that these species may not be living in Australian waters, but merely that we have no proof of the fact. Until we secure that proof we cannot recognize the bird as Australian, as otherwise we might, instead of curtailing the list, extend it by adding others that might also (with luck) be met with. Thus, I find *Reinholdia reinholdi byroni* a comparatively common bird on the coast of New South Wales, while *Puffinus assimilis assimilis* I have no record of. Yet the latter appears in every list heretofore, and I saw birds in Australian museums under the latter name, whereas they belonged to the former species.

Again, Ramsay, in his "Tabular List," wrote down localities where the species might in his opinion occur, not where they had been known to occur. Thus, 7, 10, 12, 13, 14 is a regular range for species, indicating that the bird might occur in the Wide

Bay District, New South Wales, Victoria, and South Australia, Tasmania, West and South-West Australia. This is written without consideration of known facts, a brilliant instance of the same being in connection with *Pterodroma solandri* (Gould), which, at the time Ramsay wrote, was represented by a single specimen procured by Gould in Bass Strait.

I will deal with the species named above in that order.

Fregettornis grallarius (White-bellied Storm-Petrel).—This was described from "Australia," but I cannot trace any definite record. Gould does not give any Australian range at all, writing:—"I observed it to be very generally distributed over the South Indian Ocean, and I have reason to believe that it ranges over all the temperate latitudes between the Cape of Good Hope and Cape Horn, and it is not unlikely that it may inhabit similar latitudes in the South Atlantic." Ramsay marks it for 7, 10, 12, 13, 14, noting there are *no* specimens in the Museum. Campbell copied this range, commenting:—"Flies chiefly over the surface of the southern seas, but is probably scarce in Australian waters." I have examined the type specimen, which is now one hundred years old, during which time it has been stuffed and set up to public view and light in the Paris Museum. There is no definite locality, so that in any case we have a dubious record, while no specimen has since been procured in Australian seas. From Lord Howe Island, collected by Mr. Roy Bell, I received specimens killed by cats, and stray birds, representing three distinct species. None of these agreed exactly with the type, but if that came from these seas one should. There is, however, the possibility that the type might have been procured in Western Australian seas, in which case it might show the observed differences. Until series are collected or the breeding-place discovered, this species can have no definite place on the Australian list.

Puffinus assimilis assimilis (Allied Petrel).—Under the name *Puffinus nugax* Gould wrote:—"All the specimens of this species that I have seen were procured on Norfolk Island, where it is said to breed: consequently, the seas washing the eastern shores of Australia may be considered its native habitat." Ramsay recorded it from 7, 10, 12, starrng it as being in the Museum. Campbell added Western Australia from personal knowledge, quoting Gould for the remainder of the extended range given. I have seen specimens from Eastern Australia labelled as this species, but they all proved to be *Reinholdia reinholdi byroni*, and no record is known to me of this form from the eastern coast. North also stated that no mainland record was available from the east coast. I therefore await such before admitting this form. The western race, *Puffinus assimilis turneyi* is, of course, well established as a breeding form at the Abrolhos and elsewhere off Western Australia.

Reinholdia reinholdi huttoni (Brown-backed Petrel).—I included this specimen, which I described as breeding at Snares Island,

South New Zealand, on the faith of a specimen in the British Museum from Adelaide. Re-examination of the specimen suggests that the record is unreliable, and for the present there seems to be too much doubt for its acceptance. Captain S. A. White writes that it may occur, and that he may have seen it, but he has not yet procured it. As its east coast representative was long mistaken for a different species, there is no course save rejection until birds are actually secured.

Procellaria æquinoctialis steadi (White-chinned Petrel).—There is a specimen in the British Museum labelled "Tasmania," but there is no authenticity to the record. Consequently this species must be rejected until we get a good record.

Procellaria conspicillata conspicillata (Spectacled Petrel).—Described by Gould from Tasmanian seas, this species has not been since collected. Gould later wrote:—"The *Majaqueus conspicillatus* flies both in the Atlantic and Pacific, but is most plentiful between the twenty-fifth and fiftieth degrees of south latitude. I observed it to be very abundant about the islands of St. Paul and Amsterdam, and thence to Tasmania. I also noticed it in considerable numbers off the Falkland Islands, in the Atlantic, and in the neighbourhood of Tristan d'Acunha." Ramsay only gives it as 10 and 13, and has no specimen in the Museum. Campbell gives the same range, writing:—"This large, dark-coloured Petrel, with conspicuous white markings about its face, is a flier over the southern seas, and has been noted off New South Wales and Tasmania. There has been a little difficulty about determining the species on account of the variation in some individuals of the facial markings, especially under the chin." He ranked *conspicillatus* as a synonym of *æquinoctialis*, so that the above remarks might refer to both. He quoted Eaton's remarks about the Kerguelen birds:—"In none of the Kerguelen specimens did the patch extend to the forehead, as it does in the birds from Australia." This was due to the fact that in the British Museum all the *conspicillata* birds have been labelled "Australia" on account of Gould's locality, but none bear an original label giving that place. A bird from Gould's collection bears the note "n. sp. near *æquinoctialis*" on the original label in Gould's handwriting, and on the other side "Brooke." This must have been one of the birds collected before Gould described the species, and I surmise "Brooke" may have been the name of the sailor who procured it. Unfortunately, none of Gould's notebooks was preserved, so that all we have to go on is the fact that "he observed it to be very abundant about the islands of St. Paul and Amsterdam." This suggests that region as the type locality of the species, and not "Tasmanian Seas," especially as no recent voyager has noted it in Australian waters. This species must be rejected until examples are again procured.

Prifinus cinereus (Brown Petrel).—In this instance Gould

definitely states that he "obtained specimens on my passage from Hobart Town to Sydney." I cannot trace any of these skins. Ramsay had no specimen in the Museum when he extended the range to 10, 12, 13, and 14. Campbell cites the same range, though apparently he only knew it from Macquarie Island. This species should be sought for on account of Gould's explicit statement, as otherwise there is no authentic record. It may be recorded that Gould procured several species on this trip which have since been scarce or not otherwise collected.

Pterodroma macroptera gouldi (Great-winged Petrel).—Gould wrote:—"Of this genus (*Pterodroma*), which is intended to comprise the nearly uniformly coloured black Petrels of the Southern Ocean, there are at least three species which frequent the Australian seas . . . *Pterodroma macroptera*.—I consider a bird I killed over the seas surrounding Tasmania, where it was tolerably abundant, and which differs from the next species . . . *Pterodroma atlantica*.—This species frequents both the Atlantic and the Pacific Oceans. . . . *Pterodroma solandri*.—I shot a single individual in Bass Strait on the 13th of March, 1839."

None of the three above mentioned has been met with in Tasmanian seas during the succeeding nearly eighty years. Ramsay had not specimens of any of the three in the Museum, and gave the range of the first as 10, 13, of the second 13 only, and of the last 7, 10, 12, 13, and 14. Campbell, ranging the first two together, gave the distribution as "seas of New South Wales, Victoria (probably), and Tasmania," but gave no further records, quoting New Zealand accounts of the breeding habits. I have been unable to trace any record, but the caution necessary in dealing with these night-birds is evidenced by the discovery of a form breeding on the south-west coast of Western Australia. It is thus quite possible that there may be a form breeding off Tasmania: but we are not listing possibilities, so that until we secure specimens this species should not be included in the Australian list.

Pterodroma melanopus (Brown-headed Petrel).—This may be here dealt with. Campbell wrote:—"The Brown-headed or Solander Petrel has been recorded for all Australian seas except north and north-west. However, most probably it is found off the latter coast. Gould procured his type in Bass Strait, 13th March, 1839. So long ago! yet nothing is known of its breeding quarters. When they are discovered they may prove to be high land of some verdure-clad island of the warm Pacific, and not the usual Petrel abode—a bleak island of the south." I have quoted this because, through a peculiar coincidence, this happy suggestion proved to be correct, and ten years later it was found to breed on Lord Howe Island. I have given full details in my "Birds of Australia," but so far no other straggler has been met with in Australian waters.

Phœbetria palpebrata huttoni (Sooty Albatross).—I cannot find any record of this species in Australian waters, though it appears in New Zealand waters. Until such appears we cannot recognize this species as a constituent of the Australian avifauna.

Fregetta tropica (Black-bellied Storm-Petrel).—The only specimen I examined is the one in the Macleay Museum. Gould states:—"It was almost daily observed until we arrived at Tasmania on the 19th of September, (1839). . . . In March, 1840, I again met with it in great abundance between the eastern coast of Australia and New Zealand." Ramsay, therefore, gives it for 7, 10, 12, 13, 14, and this time there was a specimen in the Museum, but whence, of course, is not stated. Campbell added nothing, so that further records would be acceptable.

Procellaria parkinsoni (Black Petrel).—The only specimen I have seen is in the same place and recorded at the same time as the preceding. Ramsay added this species, marking it for 10 and 13, Campbell elaborating "seas of New South Wales, Victoria (probably), and Tasmania." It is possible that this species may occur as a straggler, and a look-out should be kept, but at the present time the only record is the above one.

Pterodroma inexpectata thompsoni (Mottled Petrel).—The only record is my own, but it is possible that more specimens would crop up were the shores watched during and after winter gales from the south.

Diomedea exulans chionopectera was included on account of the record of the Crozet Island specimen supposed to have been picked up at Fremantle, Western Australia. I understand that doubt has now been cast upon that record, so that until confirmation is forthcoming this form must be rejected. I have written "form," as re-investigation has shown that reconsideration of the values is necessary. I described a form as *Diomedea exulans rohui* from Sydney, which was regarded as very closely allied to *chionopectera*, which I had classed with *exulans* on account of the bill formation, which noticeably differed from that of "*Diomedea regia*." I gave cuts of the bills in my "Birds of Australia," and was dubious of the generic identity of these huge birds. Recently, Murphy, meeting with a strange Albatross off the coast of Chile, introduced a new sub-genus, *Rhothonia*, for it, naming it *Diomedea sanfordi*. Lord Rothschild, from the description, would have referred it to *D. chionopectera*, noting that the latter also came from Sydney. However, the bill of *chionopectera* is like that of *exulans*, true *Diomedea*, whereas the bill of *Diomedea sanfordi* is that of "*regia*," even as I figured it. I have criticised the birds again, and would now rank *chionopectera* as specifically distinct, and allow *Rhothonia* generic rank. The young of *Rhothonia* is very different from the young of *Diomedea*, so that this seems a reasonable course, and will, moreover, lessen the sources of error in the future.

I have specimens of both from Australian waters, so that the two species would read—

Diomedea exulans rothschildi.

Diomedea chionopectera rohui.

The last-named is much rarer than the first named, while they also appear to be more shy and not so easily approached.

The last Petrel to be discussed is Gould's *D. culminatus*. This was described from a varied locality, Bass Strait being indicated, while Gould later wrote:—"This species appears to be more plentiful in the Australian seas than elsewhere: numbers came under my notice during a voyage from Launceston to Adelaide, particularly off Capes Jervis and Northumberland. I frequently observed it between Sydney and the northern extremity of New Zealand. . . . It is a powerful bird, and directly intermediate in size between *Diomedea cauta* and *D. chlororhynchus*. The specific differences of the three species are so apparent that I had no difficulty whatever in distinguishing them while on the wing." In view of this clear statement, Ramsay gave 10, 12, 13, 14, though there was no specimen in the Museum. Campbell added nothing, but under *Diomedea melanophrys* gave a table which is a guide to other observers.

Captain Anthon "logged" Albatrosses as to occurrence in the Great Australian Bight, with the result that they were absent during the months of December, January, and February, few being seen in March, increasing in April, and numerous from May to October, decreasing in November. This may be the reason why Gould's *culminatus* has not since been seen, observers having looked at the wrong time. Moreover, the above results refer to "Albatrosses." A specialist might note that different species were more numerous at different times. At any rate, the present species has not since Gould's day been commonly met with, and recently my correspondents have failed to secure one at any place.

The preceding notes will, I hope, assist in the observation of Petrels, as it is obvious that the species observed by Gould should be re-stated. Another species which Gould procured, *Garrodia nereis*, seems to have escaped recognition since his time. The difficulty in finding their breeding-places is well exemplified by the cases of *Reinholdia reinholdi byroni*, *Pterodroma macroptera albanii*, *Pterodroma melanopus*, and *Cookilaria cookii leucoptera*, to give the recent records.

I feel sure that more species will be found breeding on outlying islets, both east and west as well as south, but it is certain that we still have much to learn about Australian Petrels, and I conclude we cannot admit any Petrel as Australian unless there is a definite record and skin to verify it. Hence my title, and conclusion that a number at present included in our lists are *not* yet Australian Petrels.

Emu, vol. xvii., p. 41 (1917).—In a footnote Alexander notes *Phaebetria palpebrata* as occurring in the Bight—one in the

western, several in the eastern part. No specimens have yet been procured, though Ferguson (*Emu*, vol. xv., p. 249, 1916) also noted it.

[Mr. Mathews's article is very suggestive, and might lead to more marine excursions in Australian seas than inland. But it would probably be unwise to suppress any of Gould's Australian Petrels because specimens have not been taken since his day. In circumnavigating the southern seas, Gould paid especial attention to the Petrels, and such records as he left are very direct, and so careful an authority would scarcely figure folio plates of Petrels which had no connection with the Australian region. Moreover, since Gouldian days great ocean steamers have taken the place of sailing vessels. The former are now numerous, and in ploughing the usual ocean tracts the shyer species of Petrels may have been driven from their beats a bit. The Cape Petrel (*Daption capensis*), for instance, at one time numerous between the Cape and Australia, of later years, for some reason or other, is less frequently observed, or is not seen at all.—Eds.]

Food of Diurnal Birds of Prey.

BY D. LE SOUËF, C.M.Z.S., ZOOLOGICAL GARDENS, MELBOURNE.

THESE splendid birds are often maligned without cause, therefore I thought that a few personal observations from those who are well known to us, and on whose word we can rely, would be of value.

Mr. E. R. Caldwell, of Gilgi, Pampas, N.S.W., states that, although he has been accustomed to these birds, and also sheep, all his life, he has never known them to kill a lamb, although he has seen them eating stray carcasses. He states that he has spoken to many persons in his district on the subject, and they all say that this bird does far more good than harm, in killing rabbits. On one occasion, some years ago, he was shooting in the Cohuna district, and saw a pair of Eagles perched on a bush, and on walking up a hare jumped out and the birds went after him. He next saw the birds sitting on the rails of a culvert, and on approaching it the birds flew away, and seven hares dashed out; they evidently had gone there to shelter from the Eagles. He says that he has seen many hares killed by these birds of prey. He also saw an Eagle quickly descend and take a kangaroo-rat from its nest.

Mr. T. P. Austin, of Cobborah estate, Cobborah, N.S.W., who is so well known in his writings on ornithology, also states:—"My own personal experience is that I have never known of a single lamb to be killed by these birds. There are always a fair number of them about here, and, as far as I can see, they do no harm whatever, but much good in killing rabbits. In my time I suppose I have climbed to nearly one hundred of their nests, and have never



The Wedge-tailed Eagle (*Uroaëtes audax*).

yet seen the remains of a dead lamb in any one of them : it is always rabbits, and plenty of them. Last week I climbed to two of their nests : the first contained a single young bird about ten days old, and in the nest were about half a dozen dead rabbits ; the second nest contained a chipped egg and a young bird just out of the shell. I never think of shooting the old birds here."

Mr. R. A. D. Hood, a well-known pastoralist at Hexham, Victoria, states :—" I have never actually seen an Eagle kill a lamb, but when looking after a lambing paddock I have seen a strong lamb, about two days old, with its mother, and two hours later found the lamb dead and an Eagle eating it. I have seen an Eagle attack a lamb and be driven off by the mother. I do not think, as a rule, that they ever tackle strong lambs that are with their mothers, but may kill weak ones that the mothers have left behind. If they attacked strong lambs very often we would see more lambs marked or partially killed, but in all my experience I have only seen this once. I never think of killing these birds."

Mr. G. L. Dennis, of Eeyeuk, Terang, Victoria, states that his father, Alexander Dennis, once found an Eagle eating a lamb that it had apparently caught, and on driving the bird away the lamb was found to be still alive, although its fore-leg was stripped of flesh right up to the shoulder. " Occasionally we have found ' cast ' sheep with an Eagle trying to eat them, though the sheep was alive and vigorously kicking the birds in its struggles. Our experience is that Eagles are comparatively clean feeders, and prefer to kill their prey, though, if hungry, they will eat freshly-killed dead carcasses. As a rule we are not troubled much with Eagles in this district, but some years they come about at lambing times. I have often seen them chasing hares, which they occasionally kill ; a pair work together, and alternately swoop at the hare, which, having no burrow, is often caught. Not long ago I noticed an Eagle grab a hare and drop it, and on reaching it found the hare dead, it having been killed instantly by the talons."

Mr. C. Barnard, of Coomooboolaroo, Duaringa, Queensland, who represents Queensland on our Council, states :—" I have never seen or heard of an Eagle killing snakes. My brother and I were riding home one afternoon when our attention was attracted by a screaming Curlew or Southern Stone Plover (*Edicnemus gallinarius*), and on looking round we were just in time to see an Eagle just miss the Curlew, which was flying through the trees and keeping up a continual screaming. The Eagle followed for a few yards and then gave up the chase and settled in a tree ; but just as it did so another swooped down through the timber, but with no better luck, and he also settled in a tree. We thought the Curlew was safe now, when we heard a loud rushing sound, and, looking up, saw a third Eagle coming like a bolt from the blue, with wings almost closed and talons outstretched. He landed fair on the bird and bore it to the ground. We cantered

over, and the Eagle flew off, attempting to carry the bird with it, but dropped it after a few yards. We picked it up, and as it did not appear to be much hurt we placed it in the head of a fallen wattle. On another occasion my brother saw an Eagle dash into some timber after a Curlew, and on riding up found that he had begun to make a meal off the bird, although it was still alive. Another time I saw an Eagle pick a Laughing Jackass (*Dacelo gigas*) off a branch of an ironbark tree. Once, when driving bullocks through some scrub on the way to Rockhampton, a black boy was riding in the lead of the bullocks, when a couple of wallabies bolted across the road. Immediately two Eagles, which were flying overhead, doubtless anticipating some frightened game, dashed down through the scrubby timber; one missed, but the other landed his quarry, and the other at once returned to help his mate, and both began tearing the wallaby before it was dead. Eagles have been seen attacking kangaroos, and I have seen them eating a half-grown koala or native bear (*Phascolarctus cinereus*) that they had evidently just killed. I have also seen one eating a possum (*Phalanger vulpina*), and could see fur scattered round a hole in the tree from which the Eagle had dragged him. An Eagle was found not far from here with its foot caught in a crack of a splintered hole in a tree, where he had evidently been trying to get at a possum. I have also seen them sweep down and catch kangaroo-rats. They are also troublesome with the goat kids at times, and are much attracted by freshly-killed animals."

Mr. Arthur C. V. Bligh, of Condamine Plains, Brookstead, Queensland, states that "Very few really attack the live lambs: they mostly prefer to take the dead ones, although I have personally seen an Eagle catch a live lamb. Given a good season, lambs are strong and few die; but with a bad season and food scarce, lambs weak and dying fill part of the wants of the birds."

Mr. H. W. Ford, of Melbourne, states:—"I saw a pair of Eagles coursing a hare over the plains near Moolort; the hare got along a road fence and baffled the Eagles, as they used to fly along and settle on the fence and look down at the hare running along. After a time the hare went out on the plain. One Eagle rose and made three swoops at it, but as the bird got near the hare jumped into the air some feet, and the Eagle went under it and missed. Then the second bird came to assist. The hare evidently saw the danger, and took cover in a heap of stones. The Eagles soared overhead; the hare then made a dash for the fence, and kept along it to a patch of thistles, where it hid. The birds soared over the thicket, but could not locate the hare. At Cape Otway these birds were seen killing and eating a large grey possum. The bird killed it in a large, shallow hollow in a messmate eucalyptus, pulled the body out, and ate all but the bones, paunch, and intestines. Sometimes they kill and partly eat wallabies caught in my snares. In Gippsland, near Sale, I saw an Eagle attack a half-grown kangaroo, but I disturbed it. I often used to notice during a bush fire that the Eagles used to

soar over the timber in front of the fire, on the look-out for prey."

Our well-known Mr. Tom Tregallas mentions that on a recent trip to the Mallee district, near Dimboola, in Victoria, he "found Eagles very plentiful, and abundant evidence of the way they wage war on rabbits. One nest contained two young fledgelings and a quantity of broken-up rabbit, with a portion of a stump-tailed lizard. The last nest I climbed up to I will never forget; it was in a big belar tree, as most of them are up here, and all the way to the nest I had to climb through and amongst rabbit meat, which seemed to have been stripped off and cast aside promiscuously. As I neared the nest the stench became almost unbearable, and the blow-flies were in hundreds. Surmounting the nest, I found it contained one young bird, about three weeks old, and enough food to last him another three weeks. Rabbits in all stages of putrefaction literally strewed the nest, and there were also portions of jew and stump-tailed lizards and other unsavoury morsels that I dared not stay to identify."

Mr. Joseph A. Hill, of Golton South, Victoria, states:—"These birds are common in our district and breed there. Hares seem to be their favourite prey, and I have seen them catching these rodents when other food, such as dead lambs and sheep, was abundant. They can observe the hare in its form from a great height, the first bird coming down with partially-closed wings straight for the hare; should it miss the second Eagle comes down as the hare is running. If missed again the first bird is ready for another drive, and so they continue until the hare is either exhausted or bewildered, and is then an easy prey. The only chance the hare has of escaping is a fence, the hare dodging backwards and forwards through the fence; the Eagle here is outclassed every time. I have seen the Eagle at different times with possums; on one occasion with a full-grown rooster, and once a full-grown Turkey, and on several occasions have seen them catch Cockatoos, and only twice catch young lambs. The first occasion was some years ago, but without doubt the Eagle killed the lamb. The second came under my notice last year, when I saw an Eagle swoop at a lamb a few days old: the lamb ran to its mother, just missing being caught. The Eagle rested on a fence close by, and as soon as the mother got away from the lamb the Eagle made another swoop, again missing, and again settled on the fence. The Eagle tried a third time, the lamb only escaping by running under its mother, the bird actually striking the mother with its wings. The Eagle then appeared to have a different plan, and settled in a tree, so as to swoop from above, but the tree happened to be within range of my rifle, and I shot the bird. I had seen this same Eagle previously with a lamb just killed, but did not see him actually kill it. The bird was a very old one. I do not think as a rule Eagles kill lambs."

Mr. Tom Carter, who now lives in England, gives some interesting notes, but we have to remember that in the districts he

writes about there are no rabbits or hares—or, rather, none when he was there—so the Eagles had none to catch as food. He states:—"Wedge-tailed Eagles have been seen in pairs hunting grey kangaroo in my paddock at Broome Hill until the kangaroo was exhausted, killed, and eaten. I have known an old, full-grown ewe killed and eaten by them, and lambs—both there and at Point Cloates. I once found a freshly-killed domestic cat, gone wild, laid on the nest of this species, alongside the egg—no doubt as food for the sitting bird. The wife of one of my neighbours at Broome shot a large Eagle in the act of attacking some young Turkeys. It had apparently killed some of the same brood. The mother Turkey had attacked the Eagle in defence of her young. I have personally seen young Turkeys, up to about half-grown, attacked by these birds, and one of my neighbours saw one kill a tame Goose. On one occasion I poisoned the fresh remains of two old ewes in the evening of the same day that they had apparently been killed by these birds; next day there were six poisoned Eagles round the carcass. One of the Eagles was laid on its back and its breast and entrails apparently had been eaten by the other Eagles, as proved by their footmarks only being visible in the soft muddy ground round the dead bird. These birds usually eat the eyes of a dead animal first, and often the meat off the head, and then off the shoulder lying uppermost. After eating a dead lamb they usually leave the complete skin turned neatly quite inside out. I once watched two Eagles attack a half-grown kangaroo until it was exhausted and took refuge under a thick bush. On another occasion I came on a three-quarters grown male kangaroo that was bailed up in a corner of a paddock by two Eagles at one time. An old nest of these birds was blown down, and I found about it some bones of lambs, but mostly remains of possums (phalangers). I do not think these latter were caught alive, but their carcasses were taken after being skinned by the trappers."

Regarding the White-bellied Sea-Eagle (*Haliæetus leucogaster*), Mr. Carter states:—"They mostly eat fish caught from the open sea or mangrove lagoons. I have seen one carrying a large eel caught from a rocky bay, and of such size and weight as to impede the bird as it flew with it hanging from its feet. I followed it fast along the beach, and it kept settling, evidently having a rest, until I got so close that it left the eel and flew away. The eel was about 4 feet in length and 1½ inches in diameter. I wanted to take it home with me to skin, but the aboriginal with me refused to touch it, saying it was 'big fellow sulky.' I have also seen this bird eating large sea-snakes on the beach at Point Cloates. I saw one of these Eagles eating at a ewe's head that had got down 'lambing,' and drove it away. On several occasions birds of the year made determined attacks on the tame poultry, and I shot one in the act of taking away a Duck. One of these birds had a long chase after a tame Straw-necked Ibis (*Carphibis spinicollis*), but the Ibis was the better flier, and escaped. The White-headed

Sea-Eagle (*Haliastur leucosternus*) seems to live largely on the yellow land-crabs."

Mr. Carter also states that "Whistling Eagles (*Haliastur sphenurus*) haunt the neighbourhood of water and feed largely on water-fowl, especially Teal (*Nettion gibberifrons*). In September, 1911, I shot three White-headed Stilts (*Himantopus leucocephalus*) on a pool; two that were dead floated on the water, and one was winged. While taking off my boots in order to wade in for the dead birds, a Whistling-Eagle swooped down in front of me, and, dropping its feet, picked up one of the dead birds off the surface of the water. I then walked round to get the wounded bird, which had gone to the far side, but another Whistling-Eagle seized it before I could get there. Two days after I shot an Emu at the same pool, and while carrying the skin home on my shoulders four Whistling Eagles followed me, making most determined swoops down at the skin or hovering close above me, making their whistling cry all the time. They were such a nuisance that I dropped the skin and shot one. These Eagles occasionally kill poultry. At Point Cloates I often saw the Allied Kite (*Milvus affinis*), and noticed that they fed largely on grasshoppers; but on one occasion I placed some sheep's liver on the bare ground, and one of these birds soon came down to it. The Square-tailed Kite (*Lophoictinia isura*) sometimes came round also, and one I shot had in its gizzard the unbroken egg of the Pallid Cuckoo (*Cuculus pallidus*) coated over with fragments of the egg-shell of the Pipit (*Anthus australis*), which shows that eggs form part of their food. I noticed that the ejected food pellets of the Black-shouldered Kites (*Elanus axillaris*) were mostly composed of skulls and remains of mice. The Black-checked Falcon (*Falco melanogenys*) in my district fed largely on birds, occasionally killing the Mallee-Hen (*Leipoa ocellata*). I have the skin of one killed by them. I often saw the Nankeen Kestrel (*Cerchneis cenchroides*), and noticed that they fed largely on mice, small lizards, and beetles. I have watched them catching the latter on the wing until almost dark at night."

Mr. H. W. Ford, Victoria, also mentions that "these birds feed mostly on mice, lizards, grasshoppers, and cicadæ, and that he only once saw one taking a young bird to its nest, and he later on saw the same bird with a dead Quail (*Turnix velox*), but he thought it was a bird that had been wounded by the shooters the day before. Anyway, the Kestrel had it on a fence-post, and dropped it as he approached; only the head was eaten off."

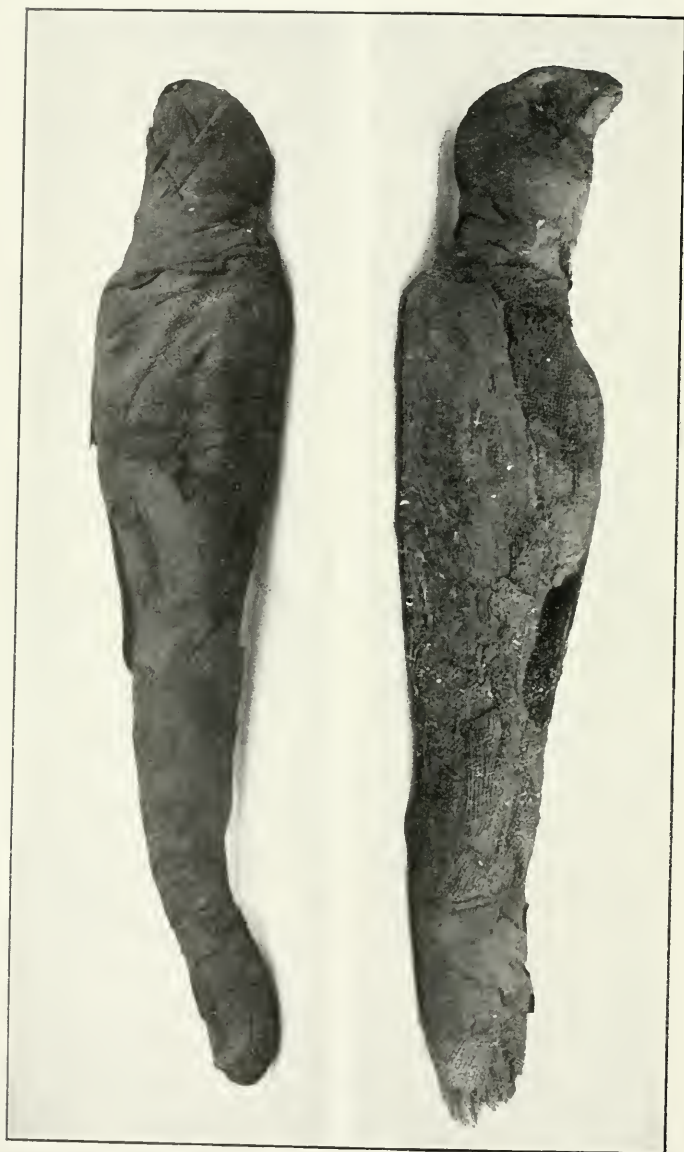
Regarding the Brown Hawk (*Hieracidea berigora*), Mr. Ford states:—"Some years ago, near Bendigo, I saw a pair of these birds nesting near where we were working, and noticed their actions daily. The birds relieved each other every three hours on the nest while hatching. The male often brought a mouse or lizard when he returned, and the hen, although on the nest, knew when he was coming long before we could see him. She used to scream, and when he was close flew off to meet him, and took the food from him with her feet while they were in the air. She

would then fly to a tree and tear up and eat the food, and fly away for three hours; she never brought any food back. After the young were hatched the hen appeared to keep at or near the nest. The male brought food—always frilled lizards, usually alive; the hen would fly and scream and take the food, fly to a tree, tear up and swallow it, then go to the nest, disgorge, and feed her young. They reared two young ones." Mr. Carter also states that these Hawks feed largely on lizards.

The same observer states that in the Cape Otway district he saw a White Goshawk (*Astur nova-hollandiæ*) that had just killed a ring-tailed possum, evidently taken from a nest in the scrub close by. When he passed later in the evening the animal was all eaten except the intestines and fur. He also noticed one of these birds chasing a tame Pigeon about the houses in the same district.

Mr. Carter states that at Point Cloates, in Western Australia, the Goshawk (*Astur approximans*) feeds mostly on birds and in dry weather frequently waits about water-holes to catch such birds as Chestnut-eared Finches (*Taniopygia castanotis*), Ground-Doves (*Geopelia tranquilla*), &c., as they come to drink, and at Broome Hill this species seems to single out Magpie-Larks (*Grallina picata*) as food: he saw them doing so on several occasions. He also once shot one of the Goshawks that was carrying a Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*) still alive in its claws. He has also occasionally seen them kill chickens and tame Pigeons. Mr. Carter has noticed that the Spotted Swamp-Hawk (*Circus assimilis*) feeds very largely on lizards, and he has, on several occasions, found lizards of a considerable size in a paralyzed state and sometimes dead, in nests with eggs of this species, but he states that birds are also eaten, and many times he has seen these birds, generally those in immature plumage, attack the poultry at Point Cloates in a determined manner, and has shot them while doing so. These birds are plentiful in Tasmania, and are seen flying slowly over swampy country: they pick up young birds if they can, as well as many lizards, and occasionally attack chickens.

Mr. E. R. Caldwell states:—"We have a pair of Black Falcons (*Falco subniger*) that have for many years lived in our neighbourhood. I noticed them lately nesting on a tree, when a Collared Butcher-Bird (*Cracticus destructor*) passed overhead. The pair set out after the flying bird, and in ten minutes they had him, and all I could find of him was his beak. I have seen them kill Magpie-Larks often; these birds suffer more than any other kind from the attacks of Hawks. From the same tree I witnessed what was nearly a tragedy. This time the Little Falcon (*Falco lunulatus*) was the culprit, with whom were associated four Black-throated Butcher-Birds (*Cracticus nigrogularis*). The Falcon attacked a *Grallina*, making several desperate darts at his intended victim, who cleverly evaded him among the old dead limbs, crying out all the time. The four Butcher-Birds joined in the chase, evidently assisting the Falcon at every turn. The



Mummy Kestrel (*Falco tinnunculus*) and Peregrine Falcon
(*F. peregrinus*).

Grallina was having a perilous passage when it left the tree and deliberately flew to a cow that was lying near by and took shelter under the animal's body, quite defeating the efforts of the would-be assassins, who flew away to a neighbouring tree. After remaining quiet for a time the Grallina came out from its cover and sat on the cow's back, only to be attacked, when it immediately sought the animal's protection again. While all the fuss was going on several other Grallinas in an adjoining tree were shrieking cries of distress, and I quite expected the Falcon to attack them when it found itself foiled; however, it simply flew away. I have seen two similar encounters with Rosellas (*Platycercus pallidiceps*), and on each occasion the Parrot took refuge under our house, which is built on 9-foot piles, to evade its pursuers. However, the most exciting encounter I ever saw was not long ago, when a Little Falcon attempted to kill a Magpie (*Gymnorhina*)—a large order for such a small bird, and it was only Maggie's cleverness in dodging among the branches that gave him any chance at all. I was standing near by, and had my gun (only wish it had been a Kodak instead), and I was struck with the desperate nature of the handsome little murderer, who was in an exhausted condition, and Maggie was done also. When I walked up neither troubled about moving, but both stood with wings and legs half extended, beaks wide open, and sides heaving heavily. It would have made a most interesting picture. I have not seen this Falcon for months, and apparently they come singly; but what a commotion they make when they do come!"

My own experiences in birds of prey are very similar to those of my Victorian friends cited above. These birds are often accused of killing Carrier or Homing Pigeons, but the Harriers, Kites, and Brown Hawks could not catch these fast-travelling birds, nor could a Whistling or Little Eagle, but a Falcon or Goshawk probably could. Regarding Eagles killing lambs, personally I have never seen it, and have met with very few who actually have. Seeing an Eagle eating a dead lamb does not for a moment assert that the Eagle killed it. I have seen Eagles catch rabbits, and it has usually been by the head, the claws penetrating the brain and causing instant death.

Regarding birds of prey and their food, it is interesting to note how the Egyptians valued these birds, especially the Kestrel Hawk, so much so that they made it sacred, Horus being their Hawk-headed god, and that deity was usually very prominent. When one remembers the utility of these birds to the Egyptians when they were attacked by the locust plague, their value can be realized. They, as well as the Ibis, which is also a sacred bird, were mummified. The two illustrations produced are from specimens I have in my own office of the Kestrel and Peregrine Falcon; the latter has the outer covering removed, so that the actual feathers show. Both of these birds were mummified approximately 3,000 years ago. We know the value of the Kestrel in our own country, but do not take the same trouble to preserve them as the Egyptians did.

Bird Notes from the Boat Harbour (Tasmania) District.

BY (MISS) J. A. FLETCHER, R.A.O.U., BOAT HARBOUR, TASMANIA.

THIS district has the name of being one of the most fertile in Tasmania, being composed of deep red soil, with an occasional outcrop of barren land. This latter is in ridges, and is a great resort of the Honey-eaters, on account of the number of wild flowering plants. The fertile soil runs to high-tide mark, but sea-birds are very few in number and limited in species. Silver Gulls (*Larus nova-hollandiae*) and Pacific Gulls (*Gabianus pacificus*) range along the coast, and nest on an island not far distant, whilst Gannets (*Sula australis*) follow various shoals of fish out at sea. The Little Penguin (*Eudyptula minor*) is present, but not in numbers. The main haunt of the sea-birds is some miles further west, on the shores of The Sisters and Rocky Hills, where the food supply is decidedly more abundant.

Diurnal birds of prey (*Accipitres*) are well represented, and have a fine range of farming land, river flats, and scrub over which to forage. I have identified the following:—

Swamp Hawk (*Circus gouldi*), of which there are some fine specimens about. It is interesting to note the increase in the numbers of Hawks these past few years, particularly in the above. The Goshawk (*Astur approximans*) and Sparrow-Hawk (*Accipiter lorquatus*) constantly search along the hedges for the smaller birds, particularly the Sparrows, who have many an anxious moment whilst these enemies are about.

A pair of Brown Hawks (*Hieracidea berigora*) built a nest last season in the fork of a gum-tree on the edge of the hills overlooking the sea. Intruders were promptly chased off by them, but one day I witnessed a funny incident. I heard a Hawk calling, and, looking up, saw one of the Brown pair flying towards its nest with a snake dangling from its claws. Then, with a lightning shot from over the hill-crest dashed a Little Falcon (*Falco lunulatus*) and caught up the hanging end of the snake and essayed to fly away. But the Brown Hawk held fast, and thus they flew along the hillside above me, each trying to make off in its own direction, and each screeching. The rightful owner's mate flew up, then the would-be robber let go and retired to a tree to preen his feathers, whilst the two Hawks flew down to the ground round the base of the hill. They returned minus the snake, and one went up to the nest. There are several nests of the Brown Hawk about, and I heard of one last season which had used a quantity of fencing wire in the construction of its home, which was built in the top of a broken-off tree.

Black-cheeked Falcon (*Falco melanogenys*).—Several pairs of these splendid birds frequent our district. Last season I was shown the home of a pair for many years, and, as the birds were

back at the same tree, doubtless another season would be added to its record. Another nest of these birds was in a broken limb, which fell while the bird was sitting, and the fine eggs were found smashed.

I have been told that the Little Falcon nests in a tree along the cliffs, but have not been able to verify the statement.

On the edge of the shore there is a mimosa scrub, and whilst searching for nests of *Sericornis* I came on the nesting tree of a pair of Spotted Owls (*Ninox maculata*). Whilst the female was sitting the male bird (presumably) sat on the branch of a tall mimosa close by. In this locality I found a nest of young Shrike-Thrushes (*Colluricincla*), nearly fledged by the end of August (1916). The parents of these built last year in the crown of a tree-fern, but deserted and rebuilt in a prickly shrub. These young were reared except one, which overbalanced and was impaled through the side of the head or cheek by a prickle, and thus I found it, dead—a sad little tragedy.

Quails are wonderfully plentiful, natural conditions for them being of the very best, and doubtless their presence accounts for the numbers of Hawks. They appear to be all Brown Quail (*Synoicus diemenensis*), but in the clutches brought to or seen by me there are the two distinct types—viz., the larger, darker, and heavily-marked variety, and the slightly smaller, faintly marked—in fact, almost white—variation. Both are found in crops or swampy localities, but paddocks under peas are the favourite nesting-grounds. As might be expected with a plentitude of food, the clutches are large, averaging about eleven, constantly fourteen, and up to nineteen.

Painted Quail (*Turnix varia*).—Heard calling.

Bronze-winged Pigeon (*Phaps chalcoptera*).—Seen on the mimosa and wild clover tree areas.

Most of the creeks drain to the Flowerdale River, and some, in their swampy courses, are the haunt of the Lewin Rail (*Hypotaenidia brachypus*) and of the Spotless Crake (*Porzana immaculata*), and I was successful last season in finding their nests and adding further to my knowledge of their economy. In both species I found birds sitting on clutches of from two to four eggs. In this warmer district the nesting begins much earlier, and eggs may be taken in August. Illness prevented me working these stretches later than September, for which I was sorry, as I was anxious to see if the second clutches would be larger.

On the banks of the Flowerdale River was a possum's nest, built in the willows, but which, judging by the quantity of down at its entrance and a feather caught below, had been used by a Duck—probably a Black Duck (*Anas superciliosa*), as a nest containing three eggs of a pair of these, built in tussocks, was reported to me by a schoolboy who was fishing along the banks of this river.

One of the nests of the Tabuan Crake contained a clutch of four, and all the eggs had a dark brown cap on the larger end.

This nest was finished for nearly three weeks before the bird used it. The clutch was safely hatched, and the parents kept the little ones to the same locality—a muddy corner in a tea-tree swamp. On subsequent visits I often heard the grunting and purring sounds with which the family were united after my intrusion. A previous nest of this pair had been covered by the flooded creek, so their housekeeping cares commenced very early, possibly July. Close to this home was the nest of a Lewin Rail, whose prettily-spotted eggs had been devoured by a water-rat. In another swamp a pair of these Crakes had a nest in some blackberry sprays, but a Native-Hen (*Tribonyx mortieri*) took possession of the ground story beneath them. By the time three of her eggs had been laid the Crakes left in disgust.

Associated with the water-birds in these morasses is that dainty little creature the Emu-Wren (*Stipiturus malachurus*), and I was fortunate enough to locate four of their haunts, and found they took on nesting cares very much earlier than in the Springfield district. One couple, whose tiny nest was placed in a tussock at the end of a log in a swamp, had hatched by the last week of August. I made several attempts to procure photographs of the family, but September weather was all against pictured records of feathered friends. The little ones of these birds leave the old home very soon, often under a fortnight, which practically leaves only one week-end to watch them. They are taken to a thick tussock, where their mouse-like movements alone betray them. When old enough to wander, "Bluebeard" takes charge of the little Bluebeard, and the mother has the rest of the family.

The Ewing Tit-Warbler (*Acanthiza ewingii*) is a merry little inhabitant of our blackwood and tree-fern clothed gullies. It can be distinguished from the Tasmanian Tit-Warbler (*Acanthiza diemenensis*) by its louder and more trilling little warble or song. I found one nest last year built in the fronds of a cat-head fern; it afterwards held four eggs, but something frightened the bird before the eggs were quite incubated, and she deserted her charge.

The Tasmanian Tit-Warblers are plentiful, and may be seen hunting for their food in the orchards and gardens. Their nests are easily found, built in any suitable bush or clump of reeds in the swamp, but they cannot be compared for neatness with those of their cousin, the Ewing Tit-Warbler. The Yellow-rumped Tit-Warbler (*Acanthiza chrysorrhoa*) is not plentiful compared with other parts of Tasmania, and is found chiefly on the fields facing the sea. It prefers mimosa and blackwood in which to construct its conspicuous nest.

The Blue Wren-Warbler (*Malurus longicaudus*) is freely distributed, and various pairs have their selected corner, to which they retire each nesting season. They are one of the latest breeders in this district, rarely starting before the end of September. The males this year lost their coats as usual in February, and were particularly late in donning their blue and black livery, the

earliest noted being in the second week in July. In previous years there were plenty to be seen in their gay dress in May. One pair nested in a clump of Canterbury bells in the school garden. They safely reared their three young, and the whole family have lived in the garden ever since, being quite undisturbed by the presence of seventy school children. One interesting fact is worth recording about the male of this pair. He disappeared for a week in July, and one afternoon there was a great commotion among the little brown Wrens, mingled with the exciting strains of his song, and he was back again in his rich spring plumage.

One of the most numerous of the small birds is the Reed-Lark (*Calamanthus fuliginosus*). Their charming little song closely resembles that of the English Skylark (*Alauda arvensis*), so



Nest of the Tasmanian Tit-Warbler (*Acanthiza diemensis*).

PHOTO. BY MISS J. A. FLETCHER, R.A.O.U.

plentiful round Bridgewater, where both these species may be heard. A pair of these Reed-Larks lived on the strip of grass between the fence and the main road, and nested twice by the school gate. The bottom leaves of a Scotch thistle was the chosen site each time.

From early spring to late autumn the Ground-Lark (*Anthus australis*) is very plentiful, but disappears when the colder weather is with us. Their nests are frequently found by the school children, sometimes with three, sometimes with four eggs, and, I am glad to say, are not disturbed by the finders.

Every farm seems to have its pair of White-backed Magpies (*Gymnorhina leuconota*) and Butcher-Birds (*Cracticus cinereus*), which nest either in the firs, gums, or blackwoods about the homestead. One Magpie's nest was composed entirely of twine ends picked up round an old threshing corner.

The fir trees round the farms shelter the Frogmouth (*Podargus strigoides*), and a schoolboy reported a nest of two eggs in the branches of one of these trees.

I had an interesting note given to me about a Chestnut-faced Owl (*Strix castanops*). The bird, accurately described, was seen towards evening cleaning out the spout of a dead gum, throwing down bits of rotten wood. Thrown down with this was half a white eggshell, rather soiled. This happened one evening early in November, and gives an idea of when these Owls take on their nesting cares.

The Black Cockatoo (*Calyptorhynchus xanthonotus*) is very fond of tearing to pieces the flowers of the giant banksia, but I cannot find out what they eat in these. In November, 1917, while exploring a gully of wild laurel, I disturbed a pair of these birds from their nest—a hole in a tall gum.

The Yellow-bellied Parrot (*Platycercus flaviventris*) is well distributed over this district. All crimes are laid to their credit, and I heard of a Sunday shooting expedition resulting in a sugar-bag full being secured by two youths. The owner of the property fortunately caught these miscreants.

The Rosella (*Platycercus eximius*) is an occasional visitor to this district.

The Black Bell-Magpie (*Strepera arguta*) is plentiful in the hills about nine miles south-west of this part.

Ravens (*Corvus australis*) are fairly plentiful.

White Cockatoo (*Cacatua galerita*) occasionally passes across.

Black Swan (*Chenopsis atrata*).—Eighteen of these birds flew across to the Arthur River after spending the early hours of the morning on the beach.

White-fronted Chat (*Ephthianura albifrons*) is present in a limited degree.

Fire-tails (*Zonæginthus bellus*) favour the 'sea frontage, and build their nests in the mimosa scrubs, where I also located the Pink-breasted Robin (*Erythrodryas rhodinogaster*).

Flame-breasted Robins (*Petroica phænicea*) are very numerous in autumn and spring, but are rarely seen at other times, their places being supplied by the Scarlet-breasted Robins (*P. leggii*).

The Dusky Robin (*Amaurodryas vittata*) is fond of the fields near the scrubs.

Welcome Swallows (*Hirundo neoxena*) are plentiful. One pair regularly builds in a small cane a few feet above the spray of the water. Tree-Swallows (*Petrochelidon nigricans*) and Wood-Swallows (*Artamus sordidus*) generally arrive in the district about the 18th July.

The Dusky Fantail (*Rhipidura diemenensis*) is well represented, and in the tall gum forests to the south the Leaden Flycatcher (*Myiagra plumbea*) can be seen among the high branches.

Every scrubby gully has a pair or more of the Whistlers (*Pachycephala*), both species being present.

The Cuckoos, both *Cuculus pallidus* and *Cacomantis flabelli-*

formis, generally arrive at the same time, but these were three weeks later this year, not appearing till about the second week in August. This last week the Bronze-Cuckoo (*Chalcococcyx plagosus*) has been calling from the hedges.

Contrary to the general rule, the Black-faced Cuckoo-Shrike (*Graucalus melanops*) was the first of the migratory birds to be noted this year. As a rule it is the last. Possibly these early individuals may have wintered on some part of the coast.

The profusion of flowering heaths and shrubs and grass-trees, and the presence of the giant banksia on the barren ranges known as The Sisters Hills, attract the various members of the Honey-eater family; but, as I intend to deal with the birds of that locality in a separate paper later on, I will only stay now to mention that during the winter, while the tree-lucernes are in flower, the school-ground is melodious with the calls of *Ptilotis flavigula*, *Lichmera australasiana*, *Meliornis novæ-hollandiæ*—the two latter even flying into the schoolroom. This year, for a fortnight, a solitary Yellow Wattle-Bird (*Anthochaera inauris*) lived amongst the flowering lucernes; he was the first of his kind I had noted during my two years' residence here. Strange to say, I have not yet seen them on the banksian tracts of the hills, though in the Midlands every clump has its pair.

Throughout the year the Spinebill (*Acanthorhynchus dubius*) is a visitor to the flowers in the garden.

I had almost forgotten the beautiful little frequenter of the banks of the rivers, the Blue Kingfisher (*Alcyon azurea*), which is to be seen along the Flowerdale River.

Occasionally a pair of Sea-Eagles (*Haliaeetus leucosternus*) fly upwards from their haunt a few miles further west, where they have their eyrie in a tall tree on the side of a wooded hill which runs sheer to the sea, and from which they have a fine outlook over the waters of Bass Strait.

A Trip in Search of the Spotted Scrub-Wren (*Sericornis maculata*) and the Little Wattle-Bird (*Anellobia lunulata*).

By C. L. E. ORTON, R.A.O.U., PETWORTH PARK, MOORA (W.A.)

ON the 15th August, 1917, Mr. Phil. Sandland and myself made a journey into the sand plain country about 25 miles north-west of Moora, Western Australia, where I knew the *Sericornis* had previously nested, having three clutches of eggs given me by a friend who flushed the bird from the nest when riding through the low scrub. He found two nests in the middle of July, and the other about the end of September, evidently being the second clutch for the season.

In our drive across the sand-plain bird-life was very scarce:

Hooded Robins, Crested Bell-Birds, Wood-Swallows, and Fulvous-fronted Honey-eaters only were noted. When about 20 miles out the sand-plain changes slightly, and distinct flats, with a reed growing amongst the scrub, occur. The flats are evidently the home of the *Sericornis*. Mr. Sandland took the east side of the track and I took the west when arriving at the Mithawandry Well. I had not gone more than 200 yards when I detected a sharp note of a bird new to me, and in attempting to get a look at the owner two young birds just fledged hopped out from under my feet. I stood still, when immediately an adult *Sericornis* made its appearance on a twig only 10 yards away, and gave me a good view of its spotted throat and light-coloured breast. It gave a few sharp notes, which at once drew the fledgelings to it, and then, just behind me, the male bird broke into song, resembling very much that of the Redthroat (*Sericornis brunnea*), only a little louder and of shorter duration. After watching them for some time I felt confident we were too late for their eggs; although walking about, I did not see any others. On reaching the buggy I found that Mr. Sandland had also heard the male bird, but could not get even a momentary glance at it: it is evidently one of our shyest scrub birds. As it was getting near sundown, and several miles to where we wished to camp, we reluctantly pushed on.

Our camp was situated on the edge of the sand-plain where the coastal thicket and red gum country starts. At break of day next morning one of the first birds to greet us with a gurgling note was the Little Wattle-Bird. Two years previously I had taken a nest within a stone's throw of our camp; so we made an early start, and had not gone far when we flushed a Little Wattle-Bird from its nest. The nest, containing one young one, just hatched, was situated about 7 feet from the ground in the centre of a parasitical growth on a banksia. The two nests previously found were also in parasitical growths in stinkwood trees. We immediately searched through the thickets, but without success. We noted the Banded Wren and Western Scarlet-breasted Robin, but they had only just started to nest.

The second day we made for Talala swamps, in the centre of the sand-plain country, and searched for *Sericornis*, without success, and on reaching Talala it was one sheet of shallow water, and simply teeming with Teal and Black Duck: but we were hoping to get the Parrots *Barnardius semitorquatus* and *Psephotus multicolor* in the flood gums surrounding the swamp. Although we tapped practically every tree, the only timber growing of any size, and Mr. Sandland climbed several trees which the Parrots had bitten round the holes, we concluded we were a fortnight too early, and we returned to camp wet through, having taken only a Baudin's Black Cockatoo, a Teal, and a Black Duck's nest.

The third morning we started for a point where I had seen a Wedge-tailed Eagle's nest on two occasions previously. On the way we searched for *Anellobia*, without success. On reaching the red gum timber I heard Mr. Sandland "coo-ee." He saw the

Eagle leaving its nest, and within a short time, with the help of a rope ladder, my friend called down from 70 feet up that the nest contained a pair of well-marked eggs.

We had decided to start for home that evening, but on reaching camp Mr. Cook, who was leasing the country, rode up and persuaded us to return on the following day, which we luckily decided to do. In the morning we started off solely in search of *Anellobia* in different directions, and I had not gone far when I heard one gurgling, and saw it chase a Singing Honey-eater from a kaufi thicket; it then sat and preened its feathers, and after a diligent search I found its nest ready for eggs. Hearing some birds farther away, I located the thicket they were in, and was following them up when I ran into Mr. Sandland, who was also after them. I found an old nest, and in the next bush was a new nest, containing the single egg, and not 50 yards away Mr. Sandland called out, and he had another nest (one egg), only 3 feet from the ground, in some red gum suckers. Our luck had changed, and before reaching camp I found in another thicket a nest with one half-incubated egg, which had been deserted. Every nest we found was lined with the dead woolly flower of the banksia, and not large enough to hold two eggs, being about the size of a nest of a Wood-Swallow (*Artamus cinereus*). In the afternoon we started for home, allowing two hours to try to secure a specimen of the *Sericornis* where we had seen them, but we could not see or hear one.

I am sure the vast sand-plains have many rare birds hidden away, as only three years ago, a few miles north, I saw the Lesser Bristle-Bird (*Sphenura littoralis*) in a thick mallee thicket. Although I have made many trips over the sand-plain country and thickets between Wongan Hills and the coast, I have never seen or heard *Psophodes nigrogularis*, yet this is the country where Gilbert first found the bird. We hope at some future date, with more time at our disposal, to make a more thorough search.

Cormorants: Are They Pests or Otherwise?

BY W. T. FORSTER, LOCAL SECRETARY TO THE R.A.O.U. IN
WESTERN AUSTRALIA.

AFTER reading the article appearing in the April number of *The Emu* * by Captain S. A. White, entitled "Further Notes on Cormorants, Their Food, Temperatures, &c.," it occurred to me that a few observations made by me during a period of nearly sixty years might be of some interest to the readers of *The Emu*, and perhaps throw some additional light on the subject of the dietary of the Cormorant.

Captain White's observations are, no doubt, of great value,

* *Emu*, vol. xvii., page 214.

having been taken with scientific accuracy as to the weight, measurements, and temperatures of these birds, but as to the food consumed by them are not so convincing, because it is unsafe to generalize from a single case, and, although Captain White examined seventeen specimens, yet they were all obtained at the same time and place, and were probably feeding in the same locality, where, no doubt, the fish mentioned as being found in their stomachs were plentiful, while other and marketable fish were correspondingly scarce.

The incidents I have to recall are as follows :—

In about the years 1862 to 1865 a party of lads, of whom I was one, were on a camping and shooting excursion on the head waters of the Lane Cove. This river meets the Parramatta River nearly opposite Cockatoo Island. It is a tidal river for about six miles upwards from its mouth, navigable for small boats at high tide to the very point of its meeting the fresh-water stream above. The party above mentioned had struck the Lane Cove above its junction with the "Falls Creek," and camped in a roomy cave for the first night of their arrival there. The fresh-water portion of the Lane Cove consists of a succession of large water-holes containing deep, permanent water, connected by a small stream, rippling over a rocky bed, confined between high sandstone ridges or hills.

On the morning following their arrival, the little party followed the course of the stream downwards. Before reaching the junction with the salt water they passed a spot where the river spreads out into a beautiful little fairy lakelet. The ranges on the northern side are very lofty, and one in particular has a peculiar formation. It is of conical shape, the summit crowned by a group of hexagonal columns standing perpendicularly, other similar columns lying on the ground beside them. Passing this little beauty spot, the party continued their course down stream, until, when approaching the last fresh-water hole, they noticed that it was full of large Black Cormorants (*Phalacrocorax carbo*), probably 30 to 40 in number. Creeping quietly up to the water-hole, they noticed that one of these birds presented an extraordinary appearance; it was swimming about with its head stretched upwards to the utmost, its mouth wide open as if gasping for breath, and the neck swollen or distended to an enormous size. This bird was shot, and, on examining it, there was found the tail of a fish closely adhering to the roof of its mouth. Extracting the fish with some difficulty, it proved to be a mullet of great size, from 15 to 18 inches in length at the least, and weighing approximately between 3 and 4 lbs. As they lay together, side by side, the bird and the fish, it seemed incredible that the latter could have been contained within the bird; for, while the tail of the fish was in its mouth, as above mentioned, the front part of the head was in a partially digested condition, the remainder of the fish being apparently quite fresh. Lying on the sand, close to the edge of the water, was another large

mullet, exactly similar in dimensions to the one taken from the bird. This was also quite fresh, and had a small wound on the back, close to the head, which might have been made by the beak of a Cormorant ; this was still bleeding.

Mullet of such a size are rarely, if ever, found so far from the mouth of a river, and this can only be explained by the supposition that these mullet had ascended to this water-hole at a very early stage of their existence, when quite small fry, and had been imprisoned there until they had grown to their present size. A fish could only pass from the salt to the fresh water on abnormally high tides, as on ordinary occasions the level of the salt water was much below that of the fresh. That these large mullet existed in large quantities in the water-hole was evident, as they could be clearly seen swimming about.

Many years later, on the Darling River, New South Wales, during a high flood, I came upon a large flock of Cormorants (*P. melanoleucus*) in a backwater or creek filled by the flood water from the main river. The water was deep, and the Cormorants were continually diving and re-appearing, while the surface of the water was literally alive with small fish about 6 to 8 inches long, which were continually jumping out of the water in their frantic endeavours to escape from their rapacious pursuers. I could not with any degree of accuracy state what kind of fish these were, but the fish inhabiting the Darling consist of a very few varieties, all of which are delicious food. At other times I have watched Cormorants on the Darling for hours, engaged in fishing, diving and reappearing at intervals of half a minute or more. As the Cormorant catches and devours his prey under water, it is not often possible to see him in the act of eating it ; only in cases of the fish being too large does he come to the surface to swallow it. After being thus engaged in diving for an hour or two, he comes out of the water and sits on the bank or on a log, digesting his meal and sunning himself, with his wings spread out to dry. When the process of digestion has been completed, after perhaps a couple of hours, he re-enters the water and resumes his fishing operations.

Clearly, Captain White's investigations, at any rate with regard to the dietary of the Cormorant, are made with the object of deciding whether the Cormorant is to be regarded as a thing of evil or a blessing in disguise : a wholesale destroyer of a staple article of human food or a harmless and discriminating bird, which, although exclusively a fish-eater, devours only fish unfit for human consumption ; a noxious pest, against which an unrelenting war of extermination should be waged, or an interesting and ornamental occupant of our lakes and coastal waters. The incidents mentioned above rather tend to show that he belongs to the former category : but, of course, further evidence is necessary before the matter can be finally settled.

The Jungle and the Snows.

BY ROBERT HALL, C.M.B.O.U.

To do my little in the interests of the nation, I recently visited India, landing at Bombay. My first inquiry was to be in the Punjab. Incidentally, while marking time, I spent fourteen days of February in the Central Provinces, staying in tents with the Acting Deputy Commissioner,* himself a naturalist of the field. The early impression I got of the jungle birds was their dissimilarity from those of southern Australia, and, to a more limited extent, from those of northern Australia. Colour, in the first comparison, and form in the second, impressed me. Apart from these, the sounds were largely different. Now I realized I was in the Indian region.

In the broad forests of teak, loose in nature and heavily carpeted with large leaves, the call of the Barbet ("Coppersmith") (*Megalæma*) was very striking, and the Carrion Vulture (*Gyps*) shows in evidence almost everywhere. The most common of birds along the clearings and throughout the western part of India is the Indian Myna (*Acridotheres*), so well known to some of us as an introduced species. It certainly has a cheerful nature in its own country, with a set-off in its fondness for loquats and other fruit. Resembling our Crane we find the Sarus (*Grus*). It is a large and very handsome Crane. Being nesting time, I found a pair in the vicinity of their eggs upon a gram field. I drove them some distance, as one would drive semi-domesticated birds. Most birds here are tame, and are only sufficiently discouraged to leave temporarily the growing crops. After the Myna, the nearest home touch is with the Bee-eaters (*Merops*) and Rollers (*Coracias*). The first is smaller in size, while both are well distributed. A familiar species, and smaller than that of Queensland, is the Pheasant Coucal (*Centropus*). The likeness made it unmistakable. Just as this genus mimics Pheasants, so does the Asiatic Hawk-Cuckoo mimic a Hawk and the Drongo. The old-world Cuckoo (*Cuculus canorus*) is to be found north of the Himalaya, which seems to be the bar so far as the nesting of this species is concerned. Along with it thousands of the smaller birds do the journey across this chain, travelling up the passes, nesting in Tibet, and returning to India to winter. Of these the Pipits and the Wagtails act as foster-parents. As with *C. pallidus*, the call of the male is quite different from that of the female.

The *Mirafra* (Bush-Lark) and the Rufous-tailed Lark are among the choicest of song-birds here. My host had cages of them, and they toned down with their fine voices the sounds of the neighbourhood. The Larks inhabit almost wholly the Indian, Palearctic, and Ethiopian regions, one genus alone being native in America and one (*Mirafra*) in Australia. It is interesting to see the Larks dusting instead of washing.

* W. A. Tucker, Esq., to whom I am indebted for this rare opportunity.

That common mischief, the Jungle Crow (*Corvus*), was usefully common, each camp in turn being partially cleaned as if the bird were a health department. It is to the village native a necessity. We flushed Bustard Quails (*Turnix*), saw Button Quails (*Turnix*), and secured for the pot the Grey Partridge (*Francolinus*). In one camp I witnessed the love combat of two males, with several females standing by; after nearly ten minutes the defeated bird flew away, and, seeing strangers, the party broke up. The Common Partridge (*Francolinus vulgaris*) ranges between Assam and Asia Minor. At one time it also could be found between Asia Minor and Spain, since exterminated. It is a handsome bird, and particularly confiding, eating out of one's hand on the first day. The native nets it for domestication, though it offers no amusement as a fighting cock. It lives between seaboard and 6,000 feet, and is known as the Black Partridge.

Coturnix, the genus of true Quails, including our Stubble-Quail, has an interesting distribution, which is approximately shown in map F. Hybrids between *C. communis* and *C. japonica* (1 and 2 of the map) exist in nature where the range overlaps, making the species very variable. *C. novæ-zealandiæ* is almost extinct. A primitive effect is given these birds by the overlapping coverts hiding the tail.

The Indian Dove (*Streptopelia*), which appeared to me to be the one imported into Australia, is familiar in and about villages. Down a stone well, and on a 15-foot level on a ledge, I saw the Blue Rock-Pigeon (*Columba*). Flying off and sharply past us, it left its eggs exposed. I remember the railway station at Patiala having 100 to 200 roosting up on the iron girders. A Pigeon I believe to be *S. sphenurus* flew leisurely past me at 9,000 feet on Kufri, a mountain preserve of H.H. the Maharajah of Patiala. To protect the Pigeons and the Pheasants from the indifferent sportsman, a gamekeeper is generally about the property. On a fine day in spring, with the indescribable beauty of the snows, it is an uncommon pleasure to move quietly among the unmolested game and see it in its precious woods. One feels the sanctuary is working its purpose well. If I had got further along the Hindustani-Tibet road, that great far-away northern trail, I should have seen the Snow-Pigeon (*Columba leuconota*). The Magpie-Robin (*Copsychus*), in its black and white plumage, is always within the jungle. Here I met the true Jay (*Garrulus*) a second time, the first occasion being in Corea, when sixty, alive, in a cage, were offered to me for a sum equal to one halfpenny each. Now I met a Bulbul (*Pycnonotus*), with a black head, and a doubtful Bulbul known as *Jerdon chloropsis*—a golden-yellow bird with a musical voice.

I saw, or believe I did, the Honey-guide (*Indicator xanthonotus*). The honey bee is numerous in the Himalaya at 5,000 feet or more. Rather unwisely, we lit a fire in the neighbourhood of two swarms, the wind carrying the smoke quietly up to the hives. Then it was time to move on. I had no experience of the bird, but

understand it is always impatient to attract the notice of man and lead him to the nest. Its share of the feast is the pupæ within.

The familiar call of our bush White-eye (*Zosterops*) quickly attracted my ear in the jungle, which is very different from our woodland. Every few miles is a village and its attendant cultivation, though wild animals live on the very skirts. Leopards come in for dogs, pigs for the crops, and many deer for something smelling sweet and looking green. The White-eye goes about in the same little flocks and lays the same pale blue eggs. The genus extends along the eastern margin of Africa, through most of India and Australia, and, as if along a northern spur, up to Japan. In Tokio I remember being offered a mounted specimen of the largest species known for a sum equal to fourpence. This species I met as far north as Vladivostock.

I saw for the first time an Indian Wood-Swallow (*Artamus*), a genus also common to Australia, and equally picturesque in its floating flight when hawking for insects. I heard nothing of their hanging in ball-like masses as we notice with the bees both in jungle and on the snow-line.

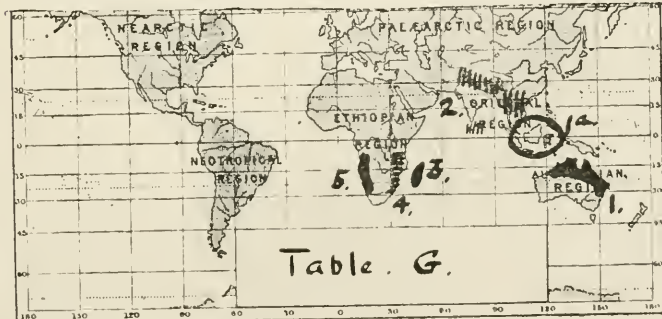
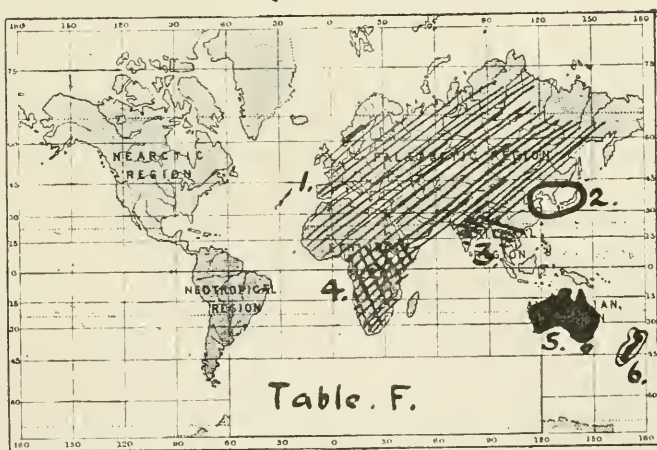
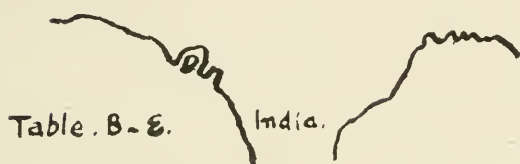
The Drongo (*Chibia*) is distributed in the Australian, Indian, and Ethiopian regions, *C. bracteata* being the only species of our continent. It is one of the few birds which hover, with a flight not continuous. Every bird appears to want to get back to its perch soon after it has left it—not because of fear, as the whole genus is courageous enough to attack the large birds of prey. We seem to have here a case of unconscious mimicry of the Indian Cuckoo (*Surniculus*)—the weaker uncommonly like the stronger.

The Indian Butcher-Bird is a *Lanius*, while the Australian one is a *Cracticus*. The former makes a larder, while the latter contents itself with leaving in the fork the remnant of a meal not wanted. The Australian bird has by far the better voice—a real contralto.

The likeness of the ways of the Nuthatch (*Sitta*) to our *Neositta*, or Tree-runner, quite attracted my eye for distribution. It was not unlike our Tree-creepers in general movements, having the combination of both forms by going up as well as going down the trunks of trees. I rather think very few insects escape their attentions. It is said the Indian species build in holes and often plaster up the entrance, leaving a fine opening. Their Siteline relatives in Australia build beautiful open nests, agreeing with their immediate surroundings. The other line of the house (*Climacteris*) lays in hollows of trees.

The Australian genus (*Graucalus*) of Cuckoo-Shrikes is well distributed in India and Africa. It may be seen both on the plains and, when the snows have melted, up to 10,000 feet. The easy, wavy flight is well known to most of us, as well as the delicate, protectively-placed nest.

Of the Black-and-White Swallows (*Petrochelidon*) there is only one species in India. There are two in the Australian region, two in South Africa, and four in America.



The Bulbuls have their home principally in the Oriental region, from where they extend to Japan, Malay Peninsula, and throughout Africa. I was rather disappointed in the song of the three species I met, considering it was their season. One I found near Solon building its nest, and it certainly should have had some time for special effort. The poets' Bulbul is probably *Daulias hafizi*, which is intermediate between the English Nightingale (*D. luscinia*) and the Eastern form (*D. philomela*).

The mimic of the jungle is the Iora—now here, now there, making it difficult to locate the owner. At a village tank, to which the carnivores and others came to drink, I saw the widespread Green-shank (*Totanus*), the northern Lapwing (*Vanellus*), and a sage old Adjutant (*Leptoptilus*). Later on I saw the Jabiru (*Xenorhynchus*). Along a nala three species of Kingfishers (*Halcyon*) were seen, keeping up the family reputation for bright and many colours.

Here also I saw a fine species in the Fishing Owl (*Ketupa*), following its avocation. It was a great bird, making a silent flight from a mango tree to the water's edge. In the nala there were plenty of malseer and murrell; there was also a stalk-eyed crab, forming a part of its food. This camp, where few Englishmen ever get, was most fascinating. It was on a flat in the bend of a gently running stream.

As with most Owls, the head would move quickly in different directions as we attracted its attention. The eye disc had stiff shafts to its feathers when compared with the limp-shafted contour plumage, giving the quiet flight to nocturnal birds. Judging by the association of parti-coloured birds, it seems possible we had in the jungle the two-coloured if not the trichromatic phases of certain of these Owls, rust-red as well as grey. The smallest known Owl is five inches in length, and what I saw I took to be the Pigmy Owl (*Glaucidium*), very little longer. Hume records it as capturing birds very little larger than itself. Its flight is certainly rapid, though very jerky. The Snowy Owl (*Nyctea scandiaca*) winters as far south as the Indus valley, and a bird even more charming than our White Goshawk. I met it in 1903 in its summer plumage in the tundras adjacent to Yakutsk. The second and less numerous Crow in this district (Saugar) is the Hill Crow. On the more open country I saw a number of Sand Grouse (*Pterocles*), the species not being identified. In the northern Punjab I saw a Tibetan Sand Grouse closely related to the *Pallas* species which migrated in 1888 from Lake Baikal, in Siberia, to England, and in vast numbers. I saw it on the Angara, which flows into Baikal, in 1903. The most sensitive of game birds, the Pea Fowl (*Pavo*), was plentiful. The natives having no objection, and it being an unprotected bird, we secured some of the males for food. It is an experience to wait quietly in the jungle while the beaters drive a flock towards one lying in position, and to see them racing hard to get away from the natives making a disturbance to encourage them to go in a given direction for inspection. There is a species of *Anthus* that goes about in a

flock of a dozen, and squats tight when danger lurks. The Indian Pie (*Urocissa*) is a well-distributed species. On a sacred tank, with its crocodiles, we saw the Cotton Goose Teal (*Nettapus*) and the Crested Pochard (*Fuligula*): this latter bird goes annually to Siberia, where, in 1903, I also saw the English Wild Duck (*Anas boschas*). In the Punjab I saw a well-developed male. Near my residence in Tasmania there are a number in captivity, and from that I know it is at night one of the most noisy of Ducks.

The White-headed Duck of the Punjab belongs to the same spiny-tailed genus as our Blue-billed Duck (*Erismatura*). India is its winter quarters, finding its way through Tibet and down one or other of the passes through North-West India. I realize now it is the Duck I met on Lake Baikal. I saw a stuffed specimen of a White-eyed Duck (*Nyroca africana*) from Kashmir that is much like our White-eyed (*Nyroca australis*). It comes down the Obi valley across the vale of Kashmir, amongst the snows. In passing over the Obi in 1903 I noticed the name of the railway station was printed Ob.

Another interesting Duck to me was the Pin-tail (*Dafila*), which winters in India. Because of its beauty and love of salt water, it is in some places called the Sea Pheasant. Another member of the genus (*D. eatoni*) I met years ago on Kerguelen Island, a solitary snow-clad island south of the Indian Ocean. I saw a *Nettion* which looked much like the Australian Teal.

The pariah Kite (*Milvus*) is generally about. Previously I saw the "Brahminy Kite" (*Haliastur*), a true Eagle. The Brahminy Kite (*Haliastur indus*), with its buoyant and easy flight, reaches the waters of Northern Australia. It seems as much an Eagle as our Whistling-Eagle (*H. sphenurus*), though A. H. Evans writes of it as the Whistling-Kite. By securing an order one may visit the Tower of Silence, in Bombay, and there see the Eagles at their work. The Parsees know the bird cannot tear the spirit or consume it, so it is called in as a purifier: the fire-worshipper then reduces the bone to ashes.

Another useful bird—this time among the Punjab grasshoppers—is the Kestrel, or Windhover (*Tinnunculus* of India and *Cerchneis* of Australia). The latter, we know, is most useful amongst the grasshoppers of the Murray River system. A desert Falcon found about the fringes of the jungle is the Lugger (*Gennæa*), for all practical purposes the Falcon of Australia. This and our Grey Falcon, while on the wing, might well be taken as one and the same bird I saw in Siberia in summer plumage. In winter it moves southward as far as Northern India. *Baza*, the Crested Hawk or Cuckoo-Falcon, of which the Great Australian Desert has one species and the Himalaya another, has an interesting distribution. *Baza* is an aberrant form of the true Falcon, having a doubly-notched maxilla instead of a single one. Map G given here shows approximately its range.

In the thicker foliage of the "flame of the forest" I saw a Barbet (*Megalæma*) other than the "Coppersmith," and quite

a common bird, though I do not know the species. This beautiful show of scarlet flowers, extending over hundreds of acres, and broken by green foliage, makes a picture of great beauty. The bombex, also red-flowered, offered good cover for many small birds I did not identify, just as the moha and tamarind do. In one of this latter a hundred fruit-bats (*Pteropus*) came regularly within two hours of the day dawn to camp for that day. In this part of the jungle I was able to identify some of the larger animals, as sambar (*Cervus*), blue bull (*Boselaphus*), cheetah (*Cynalurus*), black buck (*Antelope*), and chinkarra; leopard (*Felis*), dog (*Canis*), and buffalo (*Bubalus*) being not so easily seen. This latter is more in the west. The pariah dog and plough buffalo are very different from the wild ones. It was interesting to see the return to the villages of vast herds of domestic cattle every evening; great herds of long-legged and long-eared goats joined in the morning, going, and evening, coming. It is a most destructive animal where forestry is concerned. The bunder (*Gavialis*), with its young, was gregarious and common, while muggers (*Crocodilus*) were solitary and isolated. Wild pig was everywhere.

Having spent between 10/2/18 and 3/3/18, I passed on from the adjacent Bena Junction to Lahore. Here I found a picturesque museum building and the nucleus of a good zoological garden next to the Lawrence Garden. Sir Michael O'Dwyer, Governor of the Punjab, takes rather a personal interest in the development of these institutions. Having spent some time with His Honor, I journeyed to Patiala, staying a short time at Amritsar, the sacred city of the Sikhs. The golden temple is here. At Patiala I spent four weeks as the guest of His Highness the Maharajah, the chief of all the Sikhs, and who is at present in London representing India on the British War Council. From the palace window I could see the building of a nest of the Golden Oriole (*Oriolus*)—"my flash of summer light"; this is the Indian Mango-Bird. The Koel (*Eudynamis*) played about among the Indian Crows throughout the day. I saw the black male and the spotted mate, and noted the Koel was hunting for the nest of the Crow in which to place its own eggs. Of the many species of Koel ranging from India through Malaysia into Australia, the males are scarcely different; the females vary. Here, again, the palace grounds were crowded with Mynas, many raiding the ripened fruit of the loquat. The Ring-necked Parrot (*Palæornis*) was numerous in the larger trees. The Indian region is comparatively poor in Parrots, and I saw only two species, both of a genus which does not range into Australia. A small white Owl (*Strix*), apparently the Barn Owl, made a great fuss near my bedroom—a most unmelodious talk by several of the species. The Racquet-tailed Drongo (*Chibia*) loved to disport upon the telegraph wire, while one day, in the polo ground, a Hoopoe (*Upupa*) showed itself and all its beauty. Of the many gay birds I met this latter one had a most engaging manner. On the oval it was proudly stalking over the ground, tapping for worms just as the Thrush does in

the Botanical Gardens, Melbourne. A few moments later it was catching an insect within six feet of my head, and in the full excitement of the play. The fully-expanded wings and erected crest made quite a show, almost rivalling the brilliancy of the players. Many people know the story of Allah giving the Hoopoe this present crown in exchange for a golden crown at the request of the bird itself. Whether the bird I saw was *Upupa epops* or *U. indica* I cannot say. The geographical ranges overlapping here gives hybridism. Its call is "Hoop ho." Whether I was enjoying this my first sight of the Hoopoe more than that of my first sight of the fascinating game of polo, I am not sure. Each was seductive. However, I was able to enjoy seeing both the work and the play on this really fine oval. H.H. the Maharajah himself enters body and spirit, and when in the final his team misses by a point he comes up cheerfully and smiles all round, getting the response fitting so game a horseman. I was rather surprised to see my little bird under observation allow Crump Sahib to gallop perilously near him while umpiring for the contending forces.

On several occasions I saw the Hornbill (*Dichoceros bicornis*), a bird sacred to Vishnu, the preserving force, and in this we have a Hindoo faith—simple belief in God as visible in nature. This, I take it, is why that learned pundit, the Dewan Sahib of Patiala, would preserve the birds, the great majority of which we know are useful both to hillman and plainsman. Nesting-time was only due, so I had to be content with a sight of the hollow and what remains of last year's mudding over. Although it is an inhabitant of the Australian region, none inhabits Australia itself.

There was a pair of deep metallic blue Sun-Birds (*Cinnyris*), quite unconcerned by the presence of many people passing through the park. They were feeding among the blossoms of our Queensland silky oak (*Grevillea robusta*). Out in the jungle next to cotton and wheat fields there is a multitude of small birds, the most of which I was unfamiliar with. One, the "Seven Sisters" (*Crateropus*), is as chatty as our Babbler (*Pomatorhinus*), though its native name, I understand, really means "seven brothers." There were some species of Woodpeckers and many thousands of squirrels to make short work of the nuts between them.

Upon the higher country I saw the Spotted Woodpecker (*Dendrocopos*), with a tail of spinous shafts as we see in our Tree-creeper and in its method of ascent. A Woodpecker often lays ten eggs at a sitting, and will repeat the laying of the set half a dozen times in the season if they are taken away.

In this canalized independent native State there were quite a number of recently self-introduced water-birds. The great irrigation system is a gravitation one from one or other of the five great rivers—the meaning of the name Punjab; thus the river birds have slowly but surely spread themselves over a vast area of slender annual rainfall. The local fish, of several

genera, found in the canal tanks, have done the same. My attention was constantly called to a small species of Heron policing the overflows from those great artificial water-courses.

The Indian Jacana (*Hydrophasianus*) was common in certain of the tanks containing water-lilies with their floating leaves. Many of these sacred tanks, several hundred years old, have had the family line of the species carried on during the same long ages. The difference in the summer and winter plumage is as great as with our *Malurus* male, the change in the male being from bronzy-brown to a head and neck of gold, white, and black. I saw a moulting bird. When I met the first flock they were still in their winter gregarious group. Upon disturbing them they were able to hide by partially sinking, mostly below the water among the lilies.

In March in the Punjab I saw a Gull with a black head. If this were the Black-headed Gull it would be interesting, because of its geographical range from the Black Sea to Tibet in the summer and Northern India in winter. Off the Maldivé Islands, in February, I saw what I take to be *Sterna sinensis*, a species we find also in Australia. If this is so, it will be its most westerly limit. Off the group of islands the weather was perfect. Though we were travelling to windward 500 miles out of our course on a coal shortage, we had a certain amount of enjoyment—that is, I had, and would have had more but for the prospect of a £30,000 salvage account.

That interesting single species of the sub-family *Dromas*, or Crab-Plover, flew across the bow of our steamer when entering Bombay. This harbour certainly provides good food and shoals, and on the quieter beaches one may well expect it to deposit its single white egg in its deep burrow. I had rather a longing for its skin, to examine the webbed toes and pectinated claw. It was once thought to be an aberrant form of Tern, and, with *Chionis*, a bird I often met on Kerguelen, a link between the Plovers and the Gulls.

Among the Limicoline birds I saw the Stint (*Pisobia ruficollis*), one that goes south as far as Tasmania and north to Siberia, where I have seen it in July nesting in the Arctic sub-region and wintering in the Bassian sub-region in December. This particular flock in February, off Bombay, was just possibly making up from South Africa, but more probably wintering on Indian shores. The tide being low, many species were seen but not identified.

I made two other observations on the inland swampy ground after landing at Bombay—the Snipe and the Woodcock. The striping upon the head in the first and the barring in the second were what I could go upon. The Snipe is smaller than is *Gallinago australis*.

The game of Patiala is protected by the Maharajah, with the result that it is easy to see from the railway a flock of Peafowl and a herd of black buck, numbering quite fifty of the deer. The Government of the Punjab sets out to be a protector of its game and useful birds.

From Patiala I passed up to Simla, rising from approximately 1,000 feet to 8,000 feet, snow being still at this Himalayan low level. The unique view was beautiful, as nothing else in land masses is on so large a scale : valleys miles deep, with white chains of mountains far distant. I was able to look from the outer Himalayas over the middle to the inner, on the Tibetan side. The Snow Bunting (*Emberiza*) had just left. These smaller Himalayan birds present a likeness to Palearctic forms as we see in Crossbills and Bullfinches. On the higher uplands of the Philippines we have this likeness to the forms of both regions, while in the Celebean sub-region we have the combination of affinity to the Himalayan and Australian species. It is in the Celebes going eastward that we see the last of Oriental and Palearctic Woodpeckers. Of other Finches I saw, one had an interesting course of migration from east to west, wintering in North-West India and nesting in the Mediterranean. This was the Black-headed Bunting, and it is so with the Rose-coloured Starling (*Pastor*), a bird I did not meet. As I was proceeding to the hills I saw, on the plains, one of the elaborate nests of a Weaver Finch. The birds we call Finches in Australia are these Weaver-Birds without the specially made elongated nests. Both lay white eggs, while the African species mostly lay blue or green eggs. Many Pheasants were working up to summer heights. Monals (*Lophophorus*) are only commonly seen near Narkunda or the Kroll. From the hillside a bird flashing out in the golden sunlight and then suddenly falling like a rocket to the gorge below is a sight worth seeing. The puhari have the separate name of "bodari" for the female. A bird pointed out to me appeared to tally with the description of the western Tragopan. I know the species is found here among the Simla hill States : it is the most characteristic genus of the Himalayan-Chinese sub-region. I was able to see both the Kaleege (*Euplocamus*) and Cheer Pheasants in the ravines. The former is among the oak and rhododendron deep, steep slopes, from which they rise with a few whirrs and then shoot down very rapidly. Hearing some low chuckles, you look to see the rise and the get-away. Hunters say it nests as high as Huttoo, or higher—approximately, 11,000 feet. The habitat of these two Pheasants is so widely different that we look for Cheer on the precipitously grassed hillsides. The rocketing flight is at lightning speed. My shikari indicated where Kaleege Pheasants were calling. In the khud, below Tara Devi Temple, I saw the Partridge Chukar (*Caccabis*). Later I heard it playing about among the poultry at Khandaghat. It is common in cultivated fields at 1,000 feet near the plains, and as high as 16,000 feet. I caught a glimpse of the bird known as "Lal murgli," a jungle fowl (*Gallus*). Peafowl, Black Partridges, and the common Hill Francolin were occasionally seen, though much climbing is necessary. For instance, Chota Simla is on the ridge and Koti village at the foot of the valley beneath. To get there I walked five miles, always descending. On the return

my interpreter and myself were supplied with Spitti ponies by the kindness of the Rana. It is up this and adjacent valleys that the birds' migratory habit leads them at this season of the year, some across the higher levels, and others even to Tibet. I was sorry not to have had a view of the Snow Pheasant (*Crossoptilon*) or of *Perdix hodgsoni*, which reaches the snow at 18,000 feet.

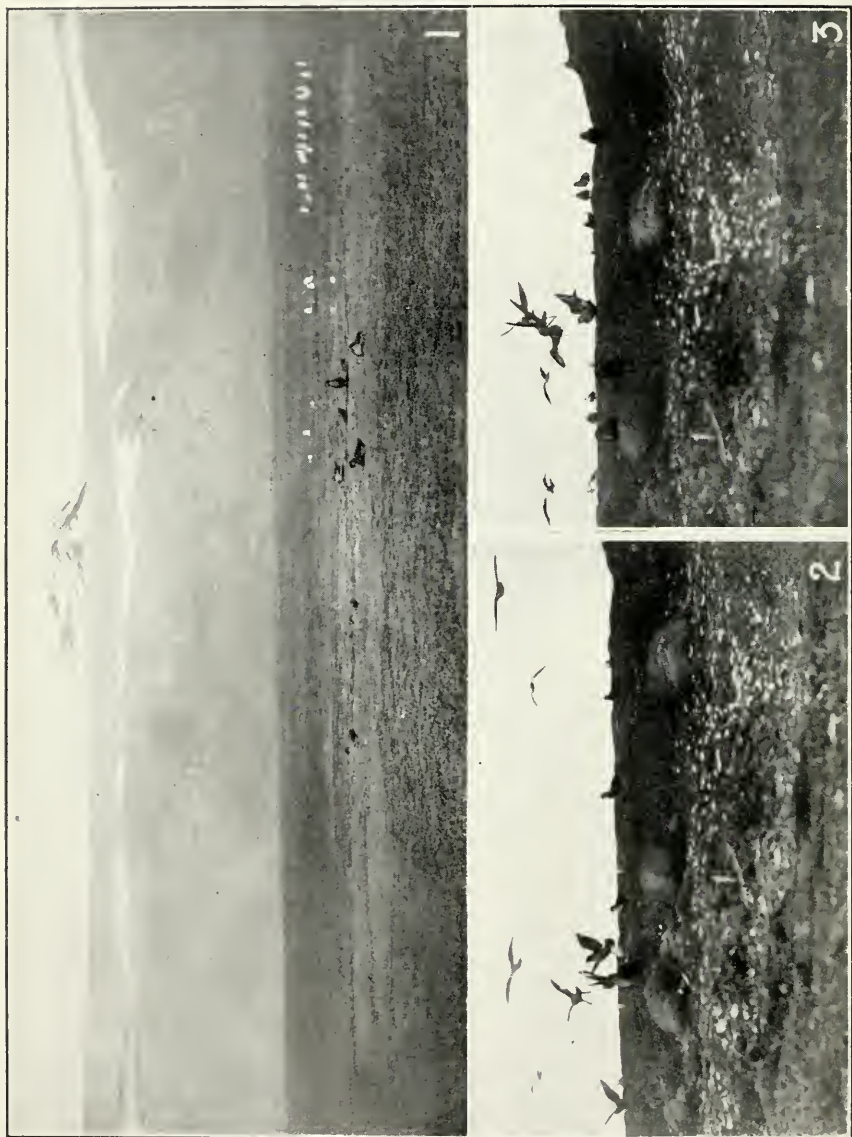
Having fixed my business at a certain stage, I prepared to get under way to Calcutta, and now saw the last of the monkeys of Simla; the wild lungur (*Semnopithecus*) and the ordinary bundur-log soon become tame. The three divisions of Simla appear to have three assemblages of the smaller species, and they run over the housetops and apply to the shops for food just as it appeals to them. Into my hotel they even came and stole and broke things if the netting were not in good order. When a number meet on the dividing lines the fights are fast and furious, and in a day or two a body will be found near by pronounced dead from wounds in battle.

Very soon I was in the plains again, with their smiling crops. Had there been a drought I might have seen the "Peace Pool" and "Council Rock" of "The Jungle Book." I did, however, see Bagheera, Grey-Brother-the-Wolf, and the "gidur-log" while camped in the jungle. With the company of Sherekhand and Baloo my Kipling came near to me. I even saw Rikki-tikki-tavi, the mongoose, go a-hunting at the setting of the sun.

I had travelled at 9,000 feet along the great Hindustan-Tibet road of deodar, walnut, and wild olive, meeting the people of Chini, and travelling the wonderful path that Purun Bhagat, of "The Jungle Book," had beaten. Now I was going east towards Benares dreamily in the company of Kim's Teshoo Lama of the hills. Entering the Bengal Presidency, one finds the perennially green grass, with myriads of water-birds upon the rice or adjacent crops. In Calcutta itself the Zoo collection of water-birds and hooved animals is good, though the markhor, with whom I wanted to be friendly, would not let his better nature go. The lush vegetation gives a good artistic touch to the animal houses and cages.

There being no immediate prospect of a boat out from this port, I booked by rail for Colombo *via* Madras. The aquarium of Madras is composed principally of eight tanks, containing fishes of the most beautiful colours. They are more charming than those of Naples, though special studies are not displayed as in Naples. Continuing by train the same day, I passed through fascinating country, with its great areas of cotton crops, cocoanut palms, and tamarisk. Obviously, this latter tree is cultivated by the Forest Department for use as firewood on a highly cultivated extent of country.

Two days later I was passing into northern Ceylon, and on the fourth following I was aboard a boat steaming out of Colombo for Australia. Passing the Cocos Islands I saw both White-tailed and Red-tailed Tropic-Birds (*Phaethon*) flapping about the steamer,



Breeding Ground of Southern Skua (*Megalestis antarctica*), Kerguelen Island,

making the call of a Cockatoo lost at sea. South of the line the Black-billed Albatross (*Diomedea carteri*) was among the tubenosed birds, our followers. But it was a single example only among the thirty of Wandering and Black-browed species. In the Indian Ocean I saw the three Skua Gulls that reach Australian shores. In February I saw, off the Laccadive Islands, what I took to be *Stercorarius crepidatus*, the Arctic Skua. It was the uniform brown variety, appearing too small for *S. pomatorhinus*. In either case it was wintering, as the former is fairly common in Tasmania, and the latter in Northern Australia. The Tasmanian form appears in either of two entirely different phases. It nests in the Lena River country, though I was not fortunate enough to see its eggs and nest.

A cold, strong wind from the south had encouraged many of the Great Skuas (*Megalestris antarctica*) to go north into the Indian Ocean. From that time on several travelled with us far into our easting of the Leeuwin. Many, if not all, of them had been bred on Kerguelen Island, further south. The illustration shows a nesting-flat under Mount Wyville Thomson, on Kerguelen Island, with the birds quarrelling for food over the bones of elephant seals killed by us. They were taken prior to this little excursion that gave me so fine an opportunity for comparison between the bird fauna of the Australian, Indian, and Eastern Palearctic regions.

An Afternoon Among the Birds in the Baltimore (Md.) Woods, United States of America.

BY EDWIN ASHBY, M.B.O.U., R.A.O.U.

IN company with a bird-lover, Mr. Hammond Brown, who has done good service in popularizing the study of bird-life in the State of Maryland, I visited the woods in the suburbs of the city of Baltimore on the 6th July, 1918.

On leaving the train we entered some low scrub bordering a small creek. The first bird to attract our attention was a male Towhee (*Pipilo erythrophthalmus*). The call was a sharp double note, but later in the afternoon we heard it in full song. The male chose a dead bough near the top of an exposed tree, and there kept up a not unpleasing series of four or five notes—"Tow-hee-e-e." The male we saw was about 8 inches long, black head and back, and a striking rufous patch along the side, tail long and tipped with white. My companion then called my attention to the sharp call of the Cardinal, one of the handsomest of the American birds. In the thick leafage a Cat-Bird (*Dumetella carolinensis*) flew on to a bough quite close to where we stood, and gave us a fine exhibition of its powers of song. While we were not favoured with its whole repertoire, it went through quite a good series of warbles and trills, interspersed at irregular intervals with its strange

"mew," more like the cry of a newly-born kitten than the "meow" of an adult cat. Many think that this is the most gifted singer of the American woods, and Mr. Brown informed me that it imitates the songs and calls of the other native birds. Its plumage is a dark leaden-grey: in shape it is more slender than a Starling, and longer in the tail. A series of whistles coming from an oak tree on the other side of the creek broke in upon the Cat-Bird's sweet melody. There was something distinctly Australian and familiar about it—two or three low notes, and then a series of whistles with an upward inflection, quite a fair imitation of our Pallid Cuckoo of Australia, and, but for the beginning and the final note, which is a low one, the similarity was very close. It was the Yellow-billed Cuckoo (*Coccyzus americanus*). This Cuckoo actually makes a nest and incubates its own eggs: it has not degenerated as far as its Australian relative. In the thick, low bushes, also on the other side of the creek, a Song-Sparrow (*Melospiza melodia*) poured out its sweet little trill.

We here crossed the creek into an open grassy field rising into a stony hillside. We quickly spotted a pair of Plovers, keeping out of our way by means of a series of short runs, which action, together with the bobbing of the head, is so typical of the Black-breasted Plover of Australia. The general colour of the plumage was yellowish-brown, black crown, two black bands on the white breast, white neck ring, and rufous rump. These birds are known as "Killdeer" (*Oxyechus vociferus*), from their call.

After getting through a fence we entered a thick wood without any under-bush. The trunks of the trees were fine straight boles. While oaks of several species predominated, there were ash, hickory, pecan nuts, beech, and others. Taking a seat on a fallen log, we listened to the strange coughing notes of the American Crow (*Corvus brachyrhynchos*). In outward appearance he much resembles the Australian bird, except there is not the same sheen on the wings, but our bird would do well to adopt some of the notes of his American brother. In a tree close by a young Red-headed Woodpecker (*Melanerpes erythrocephalus*) was calling for food, which its handsome parent soon supplied. This species is one of the most handsome and common of the Woodpeckers. It has a crimson head and throat, black back, wing coverts, and primaries, and secondaries pure white, and light-coloured abdomen. The calls are loud, the most common being a whirring cry. In another patch of the wood we saw a pair of Flickers (*Colaptes auratus*). These striking birds are large relatives of the true Woodpecker, and, although the beak is less powerful, their habits are very similar. While this species has a few bright red feathers on head and neck, its most striking feature is the rich golden colour of the under side of the primaries: it gives to the bird when in flight a handsome yellow appearance, and accounts for one of its names—"Golden-winged Woodpecker." The length of the bird is 13 inches.

On skirting an old mill pond in the hope of seeing some Herons

we were able to identify three species of Flycatchers. The first seen was in big timber — the Crested Flycatcher (*Myiarchus crinitus*), a long-tailed, somewhat slender bird, 9 inches in length, grey head and back, slight yellow wash on belly, and patch of rufous on wing and tail. It was able to elevate its crest to the same extent that our Australian Restless Flycatcher (*Seisura inquieta*) does. A small grey Flycatcher, Phoebe (*Sayornis phoebe*), 7 inches in length, was catching gnats over the water. Shortly afterwards we noted a veritable imitation of the same bird, but with a very different cry, of which the word "Pee-ah-wee" is a good rendering. It is known as the Wood-Pee-wee (*Myiochanes vireus*). The Wood-Pee-wee will come back to the same twig after each catch, whereas the Phoebe more often alights on the nearest resting-place after a catch is made. All these Flycatchers are much more slender than our Microëcas; in build they approximate to the Caterpillar-eaters (*Lalage*), but in flight and method of hawking they are very similar to the former.

In the grassy meadows we counted nearly a score of the American Robin (*Planesticus migratorius*). In old collections it is placed with the European Blackbird in the genus *Merula*. Its notes partake of the character of the Blackbird's song, but are nothing like so full and melodious. Its movements are most similar to those of the European Blackbird. The red of the breast and belly is a rich rufous, but no suggestion of what we understand by "red."

In a patch of larger timber a flock of handsome Purple Grackles (*Quiscalus quiscula*) flew up with sharp cries. The plumage of this bird has a purple sheen, and the tail is of exceptional length. They feed on damp meadows; I noticed numbers on the grass in the open spaces in the City of Washington (District of Columbia). We next had a good view of a Blue-Bird (*Sialia sialis*). The blue is a bluish-grey under the shade of the forest trees, but in the sunshine it is a charming object, the whole of the upper plumage being then bright blue, though the under is purplish-rufous, which contrasts strangely with the blue.

Quite a large bird next attracted our attention as it flew out of a thick isolated tree growing in the open meadow and made its way into the thick shade of a clump of lofty oak trees. One caught a glimpse of a distinct bluish shade in its plumage, but the light was not in the right angle to see it properly. Its loud, harsh cry proclaimed it as one of America's handsomest birds, the famous Blue Jay (*Cyanocitta cristata*). With the aid of the field-glass the lovely blue of its crest and back and the glorious blue of its wings and tail were easily visible. Quite a number of small birds made a dead set on him, diving and pecking at the Jay, uttering angry, insulting exclamations, expressive of their enmity. And no wonder, for the Jay is most destructive to the eggs and young of the small birds, and therefore they put forth their best efforts to drive the Blue Jays away from the neighbourhood of their nests.

The stream we had been following had increased in volume considerably, and now, as we entered an extensive piece of Maryland forest, composed of at least half a dozen species of oak—the strongly-toothed leaves of the Black Oak (*Quercus velutina*), the large crenulate leaves of the Chestnut Oak (*Quercus acuminata*), the very large leaved White Oak (*Quercus alba*), the glassy, maple-like, deeply-cut leaves of the Scarlet Oak and the Pin Oak (*Quercus coccinea* and *Q. palustris* respectively). Some reached 100 feet in height, or nearly so: others, where they had room, were broad-spreading trees. Interspersed with these were several species of maples—one species, the Silver Maple, forming stouter trunks than those of the oaks. Chestnuts, pecan nuts, and its relative hickory, beech, and many others also occurred. The trunks of many were covered with Virginian creepers of several different species, the whole forming a mass of leafage, greatly varied in detail and in shades of green. Lit up as it was by a hot, bright sun, it formed one of the most beautiful pieces of forest scenery it has ever been my lot to witness. The only Australian bush that can in the least be compared to it are the rich “brushes” of Queensland. The humid atmosphere and hot sunshine of the Maryland summer is very similar to the weather I experienced in the Blackall Range, in southern Queensland. It was hard to picture the American winter. A few months ago the scene I have attempted to suggest was a leafless forest, the ground deep in snow, and the temperature going down for some days well below zero. This extreme change in the American seasons is hard for an Australian to realize, but accounts for the great spring and autumn migrations. I understand the fauna of Baltimore is more than doubled during the migratory seasons. Some of these wanderers only reach their northern nesting-limit a few weeks before they have to turn south again, allowing barely sufficient time for the young to gain enough strength to undertake the long southern journey. While there is nothing new in these remarks, the points touched upon are greatly emphasized by one's presence in the actual locality of these migrations.

Our course still followed the creek: on the other side we heard a sharp call-note, and then, with the aid of the glass, saw a small bird, longer in tail and body than one of our Australian *Sericornis*, but both in markings and movements showing some resemblance. The white line over the eye and the strongly speckled breast and under side could be easily seen. The song was a series of about half a dozen quickly uttered, not unmusical, notes. The bird was one of the Warblers, called the Water-Thrush (*Seiurus noveboracensis*). It feeds along the edges of wooded creeks. While watching the little Water-Thrush a loud rattling cry was heard a little down stream, and a fine specimen of the large Belted Kingfisher (*Ceryle alcyon*), 13 inches long, settled in a tree overhanging the stream, and we were able to get an excellent view of its double-banded breast and blue back. Our next find was an especially lucky one, for from a muddy depression filled with soft mud and

shaded by the thick overhead forest, only a few yards in advance, up flew that strange bird, the American Woodcock (*Philohela minor*): its long beak, and eyes set far back on the head, were clearly seen. I was sorry to learn that in many of its old haunts this bird is found no more: the guns of the sportsmen have well-nigh exterminated it in these localities. An Oven-Bird (*Seiurus aurocapillus*) gave us one sample, and that was all, of its peculiar ascending song, described as "the word 'teacher' repeated five or six times, and gathering strength and volume with each syllable." While we had a fair view of it, the deep shadow of the forest prevented our getting the markings distinctly. Several of the Vireos were seen in the tops of the lower trees, but the Red-eyed Vireo (*Vireosylva olivacea*) was the only one identified. Its short warble is repeated again and again, and it is locally known as the "Parson-Bird," gentlemen of the cloth evidently being credited in Maryland with "oft repetition."

Our delightful ramble was concluded with a close view of what is perhaps the most lovely of all the birds seen—the Indigo Bunting (*Passerina cyanea*). While the female was quite plain, the male was gloriously blue, every part of his 5½ inches—not the shot, shiny blue of our Australian *Maluridae*, but still a gloriously bright indigo blue, especially when seen in the blazing sunlight. The male bird kept largely on the ground, under the low, creeping shoots of the dewberry, at most about 18 inches from the ground. He showed himself as he flitted from low bush to bush, and then he gave us a splendid view while feeding a young one. By keeping close to this unquiet child we were able to get several splendid views of the parent.

I am indebted to Mr. Hammond Brown and to Chester A. Reed's little "Bird Guide" for the identifications.

Description of a New Sub-Species of *Malurus cyanotus*.

BY H. L. WHITE, M.B.O.U., BELLTREES, SCONE, N.S.W.

MR. Sid. W. Jackson, while recently collecting for Mr. J. H. Bettington and me on the Diamantina River, Western Queensland, obtained a blue-and-white *Malurus* which differs from the southern and western varieties by its strikingly lighter colour—light violet-blue or cornflower blue: it has also much more white on the wings, extending to the secondaries.

In *The Emu*, vol. xiii., p. 171, Major Macgillivray mentions that Mr. W. M'Lennan collected the White-winged Wren further north, on the Cloncurry. Should these be similar to the Diamantina birds, and the colour constant, I suggest that the northern variety be called *Malurus c. diamantina*, and, in the vernacular, Light Blue-and-White Wren.

An immature male, in drab plumage, is likewise lighter in colour both above and below than typical specimens of *Malurus cyanotus*.

Description of a New Sub-Species of *Acanthiza nana*.

BY H. L. WHITE, M.B.O.U., BELLTREES, SCONE, N.S.W.

***Acanthiza nana*.** Little Tit-Warbler.

A study of variation in this little species is interesting, as illustrated by the material in the H. L. White Collection at the National Museum, Melbourne.

Mr. G. M. Mathews recognizes *Acanthiza n. dorotheæ*, from Lithgow, as the richest ("much yellower") bird (*vide Emu*, vol. xiv., p. 60); but it does not appear so, judging by typical birds, say, from Blacktown or Rose Bay. The really richest specimens are from my own district—Belltrees (Upper Hunter), New South Wales. According to colour-chart, the under surface approximates a Strontian or strong citron-yellow. Hartert's *A. n. mathewsi*, from Eastern Victoria, is duller than either of the two more northern races. So much for the yellowish varieties.

Passing from heavily-timbered eastern Victoria to the more open western Mallee country and contiguous parts of South Australia, we have a variety (*A. n. pygmea*, Milligan) which is cream or straw-coloured on the under surface. Following up the inland country and proceeding north again, we pick up a similar phase at Cobbora, N.S.W., and still farther north, on the Dawson River, Central Queensland. Birds from the last-named locality have a decidedly larger and longer bill, not the "very short, fine bill" of *A. n. pygmea*. I venture to suggest that this extreme northern bird might be known as *A. n. dawsoniana*.

The R.A.O.U. "Check-list" includes Southern Queensland in the range of *Acanthiza nana*, but neither Mathews nor North does. Apparently the species has not previously been recorded from Central Queensland.

Notes on Birds Seen on the Murray River, August, 1918.

BY W. B. ALEXANDER, M.A., LIBRARIAN R.A.O.U.

THE writer had the pleasure of making a holiday trip by river steamer down the Murray from Swan Hill, Victoria, to Morgan, South Australia, in the last week of August, 1918. Since Capt. S. A. White, in *The Emu*, vol. xviii., p. 8, gave an account of the birds met with by himself and Dr. Morgan at Lake Victoria and on the Murray River for 100 miles down stream, it is unnecessary for me to describe the river itself or the extensive sheets of water extending from its banks in the flood season far away among the trees. Since, however, my journey extended over nearly 700 miles, and Captain White's account refers only to the 100 miles between Lake Victoria and Renmark, it is worth while to

point out that, judged from the standpoint of the ornithologist, the upper part of the river, where it is narrower and there are fewer settlements, is the more interesting, and that some species, notably Whistling-Eagles, are much more plentiful in the Victorian-New South Wales section of the river than in the South Australian. Since my observations were limited to birds seen from the moving steamer, or on the river banks during the short periods when the steamer stopped to take on wood for fuel or to discharge and load cargo, I naturally did not see as many species as Captain White and Dr. Morgan, who penetrated into the backwaters and flooded areas in a small boat. I actually identified 51 species of birds as against 131 recorded by Capt. White; but of these four species were not met with by him. I give below notes on these and on a few other species as to which my observations supplement those given by him.

Marsh Tern (*Hydrochelidon leucopareia*).—A small party flew past us when we were standing on the bank of a small billabong on the New South Wales bank of the river whilst the steamer was loading fuel. Their red beaks and black heads were conspicuous. Capt. White did not meet with this species.

White Ibis (*Ibis (Threskiornis) molucca*).—Plentiful between Swan Hill and Mildura, but only occasionally seen lower down.

White-eyed Duck (*Nyroca australis*).—Some very large flocks of "Wigeon" were seen on the river just below Wentworth, at the junction of the Darling and Murray, and some were seen lower down. Unlike the other species of Ducks, which were mostly in pairs, these birds were still in flocks. They were not met with by Capt. White.

Whistling-Eagle (*Haliastur sphenurus*).—Extremely abundant on the upper part of the river. Some were almost always to be seen sailing overhead, and their fine whistle is one of the characteristic sounds of the river. On the first day's journey, at almost every turn of the river one of these birds was seen to leave its nest on the approach of the steamer and join its mate in the air.

Little Falcon (*Falco longipennis*).—One was seen to fly across the river with a small bird in its talons. The species is not recorded by Capt. White.

Nankeen Kestrel (*Cerchneis cenchroides*).—These birds were evidently nesting on the cliffs along the lower part of the river.

Blue Kingfisher (*Alcyon azurea*).—One flew out of a hole in the bank as the steamer passed. The species was not met with by Capt. White.

Chestnut-crowned Babbler (*Pomatorhinus (Pomalostomus) ruficeps*).—During a walk through the mallee on the top of the cliff at Morgan we came on a family party of these birds. They made off when we were some distance away, but one young bird apparently got entangled in a bush, and its cries on our approach

brought the parents and the other young ones back to the spot. They flew round, calling out and spreading out their tails, giving us a fine view of them, until the youngster disentangled itself, when they all flew off together. Capt. White informs me that this species has not previously been met with so far down the river. It seems early for the young ones to be fledged.

Yellow-throated Miner (*Myzantha flavigula*).—Capt. White states that the Black-headed Miner, being much more robust, "seems to keep this bird back from the river timber." In the upper stretches, however, it appeared to be the commoner species in the trees along the river banks, though lower down there is no doubt that the Black-headed Miner is the more plentiful bird.

Some Observations by a Bird-lover in the Eastern Mallee Fringe, Victoria.

By A. C. STONE, R.A.O.U., SOUTH YARRA, VICTORIA.

A FRIEND and myself were fortunate in having perfect weather for our trip into the Mallee fringe, and those of us who have had Mallee experience know how perfect the weather is sometimes (perhaps as a compensation for some of its imperfections), approximating closely to Egyptian conditions.

Leaving Lake Boga, we proceeded in a westerly direction, and one of the first nests found was the perfect and beautiful one of that Mallee gem, the Red-capped Robin (*Petroica goodenovii*). The nest was placed 5 feet high on the fork of a tea-tree in the midst of a dense clump of the same timber. The nest contained three handsomely marked eggs. A few yards further a Black-backed Magpie (*Gymnorhina tibicen*) came swooping down, plainly indicating by its movements the nearness of its nest, which was indeed close, but placed high in the branches of a box-tree, and contained fledgelings. The "Shellies" or Warbling Grass-Parrots (*Melopsittacus undulatus*) had only recently arrived, but all day long we were within sight of flocks of from 20 to 100. Within a fortnight I received word that they were all busily engaged at their severally selected nesting-sites. The White-browed Babblers (*Pomatorhinus superciliosus*) were particularly busy, as usual, building nests that apparently they had not the remotest idea of laying in. This habit seems very deep-seated in the nature of the Babblers. One nest we found contained three fresh eggs, very beautifully covered with the thin hair-like lines. Just over a limestone ridge, in some fallen mallee scrub, we found the cosy nest of the Black-backed Wren (*Malurus melanotus*), containing three young ones nearly ready to leave the nest, and the parent birds fussily objecting to the intruders. Farther on, in similar country, we found another nest of the same species almost completed. Wood-Swallows were plentiful, particularly the White-

browed (*Artamus superciliosus*) and the Masked (*A. personatus*). Their somewhat makeshift nests were in evidence everywhere, but the birds had only recently arrived, and therefore full clutches were rare: in eleven nests, two was the maximum. Later on in the day we observed many hundreds of Wood-Swallows occupying the upper strata of air, many of them slowly coming to earth, this, I believe, being this particular flock's first arrival in the district for the season. Away, even higher in the bright, clear sky, several hundreds of Cormorants were carrying out concerted movements and fresh formations on their way from Lake Bael Bael to Lake Boga. In the overhanging boughs of a clump of mallee, 7 feet high, the somewhat loosely-constructed nest of the Butcher-Bird (*Cracticus destructor*) was found, containing a full clutch of four eggs. These birds, equally with the Black-backed Magpie, almost immediately resent the intrusion of a stranger into their domain, and in some districts have earned an unenviable name for destroying caged Canaries. A large number of Tricoloured or Crimson Chats had recently appeared, and were now spread over the district busily engaged in selecting suitable nesting-sites. In previous years they appeared to nest in any suitable site offering near the ground in low scrub, or right on the ground under dead brushwood. In favourable seasons Lake Boga district seems to be a happy hunting-ground of three varieties of these really beautiful birds—namely, the White-fronted (*Ephthianura albigrons*), Orange-breasted (*E. aurifrons*), and Tricoloured or Crimson Chat (*E. tricolor*).

On the previous day I had gone in an easterly direction and found the delightfully pretty Orange-breasted Chat rearing young in the blue-bush. They were exceptionally tame, and in the bright sunlight they looked like bits of golden fluff, their little black bibs accentuating the golden colour. The male Orange-breasted Chat delights to perch on the topmost twig of the stunted blue-bush (which is never more than 2 or 3 feet high) and pour forth his poor little metallic song. There were fully a score of pairs of these birds, and they have always appeared to be confined to this one spot when they do happen to visit the district from the interior. On the outskirts of the Chat colony a pair of the beautifully-marked White-winged Wrens (*Malurus cyanotus*) had successfully hatched three young ones, and the movements of the parent birds through the bushes in search of food for the nestlings reminded one of those of mice. Very close to the Butcher-Bird's nest we found the pendulous nest of the White-plumed Honey-eater (*Ptilotis penicillata*), containing one young one and one egg. The nest next claiming attention was that of the Black-and-White Fantail (*Rhipidura motacilloides*), containing four eggs, with the parent birds bravely and fearlessly trying to drive us away from their nest.

A short distance and we discovered the poor makeshift nest of the Australian Brown Flycatcher (*Microeca fascians*), with two eggs, and the similarly situated and hardly better nest of

the White-shouldered Caterpillar-eater (*Campephaga humeralis*), containing three fresh eggs. This latter bird has a succession of very pretty notes, and whilst incubating its eggs it is very tame, and will allow itself to be touched by hand. These birds are numerous every season in the Lake Boga district. The pretty little nest of the smallest Victorian bird, the Short-billed Tree-Tit (*Smicrornis brevirostris*), was then visited, and contained three dainty eggs. It was placed in the dense drooping foliage of a mallee sapling. Next variety to claim attention was the large, mud, bowl-shaped nest of the "Black Jay" or White-winged Chough (*Corcorax melanorhamphus*), placed over 50 feet high on the horizontal branch of a tall eucalypt. The build of the tree was such as to preclude all thought of putting my limited climbing powers to the test. The birds were extraordinarily tame, and allowed us to get within 12 feet of them whilst on the ground. There were no lack of Yellow-tailed Tit-Warblers (*Acanthiza chrysorrhoa*) and Ravens (*Corvus australis*).

We boiled the billy and had lunch on the shore of Round Lake (native name, Koonat Koonat, named from the cotton-weeds that grow so thickly in it, and which were fished for and used extensively in the "big drought" of 1902 for feeding the stock—over a dozen boats were to be seen at one time engaged in the occupation). During our lunch we were favoured with visits by the Spiny-cheeked Honey-eater, Black-and-White Fantail, Great Grebe, Dottrel, Hoary-headed Grebe, Black Swan, Marsh Tern, Silver Gull, Swamp Hawk, Kestrel, Little Cormorant, and Welcome Swallows, and, of course, Sparrows. We came upon many traces of the Mallee porcupine (spiny ant-eater, *Echidna*) during our ramble.

Next day I accepted an invitation extended to me by Mr. Walsh, of Fairley, to visit the Ibis rookery in Reedy Lake. I arrived at mid-day, and was generously entertained. After lunch we put off in a fisherman's "flatty" to visit the Ibises. When nearing the rookery, which is in reality a large bed of polygonum of several acres in extent in the middle of the lake, and growing in 8 to 10 feet of water, we were met by parties of Ibises, which got larger as we approached, until the air was thick with the birds, detachment after detachment flying by and over our heads, and wheeling rapidly in returning. Upon clapping the hands close to the island, the noise of flapping wings was deafening. There must have been 20,000 birds on the wing at one time. I saw many Black-billed and Yellow-billed Spoonbills, a few White Egrets and Black Ducks. The nests of the Ibises were simply covering the vegetation in places, and nearly all contained eggs or young; generally there were three eggs, but in one instance of the White Ibis I saw four eggs. The White and the Straw-necked Ibises seemed to be nesting in small colonies of 20 or 30 birds, and were spread over the island like a chessboard. I was delighted with the privilege of having been able to inspect such a large rookery at such close quarters. Mr. Walsh has had the

whole rookery proclaimed a sanctuary. In the reeds close to Fairley I saw numbers of the Black-tailed Native-Hen, Bald-Coots, and Australian Coots. Three nests of the Black-backed Wren each contained three eggs, and a nest of the Grass-Bird also contained three eggs. The Kestrel, Fairy Martin, Laughing Jackass, and Red-backed Parrots were freely nesting in the hollow trees around the lake. Mr. Walsh is indeed fortunate, as a bird-lover, in having his home in such splendid surroundings.

Leaving Fairley next morning, I visited a large colony of Fairy Martins under a large road-bridge, and also found two nests of the White-winged Wren with young ones in them. I regretted that my stay was so short, and had to cycle over some very bad bits of road on my way to catch the train for Melbourne.

Descriptions of two New Nests and Eggs.

BY HENRY L. WHITE, M.B.O.U., BELLTREES, N.S.W.

Malurus (Nesomalurus) leucopterus edouardi. Black-and-White Wren.

When visiting Barrow Island, under a special permit from the Western Australian Government (the island being a protected area), Mr. Whitlock was asked to pay some attention to this bird, and to procure its eggs if possible. The task was a comparatively easy one, several clutches being secured.

Nest.—A typical nest was described in *The Emu*, vol. xvii., p. 179, but a curious variation was obtained during the later trip. The bulk of the material was similar, but the outside decoration consisted of pieces of cast snake-skin freely worked into the covering. Another nest was warmly lined with wallaby fur.

Eggs.—Type clutch of three eggs; rounded ovals in form, surface of shell very fine and slightly glossy; ground colour white, marked all over, but particularly at the larger ends, with small markings and specks of light umber and pale reddish-brown.

Dimensions in parts of inch :—(a) .58 x .45, (b) .57 x .45, (c) .57 x .45.

Taken by Mr. F. Lawson Whitlock at Barrow Island, Dampier Group, Western Australia, on 2nd August, 1918. Nest well concealed in tussock of sea-grass.

Co-type.—Clutch of three eggs, rather oval in form, especially (c); surface of shell very fine and slightly glossy; ground colour white, while in (c) there is the very slightest tinge of pink; marked all over (and particularly at the larger end in (c) with minute spots and specks of light umber and reddish-brown.

Dimensions in inches :—(a) .58 x .43, (b) .59 x .42, (c) .62 x .42.

Taken by Mr. F. Lawson Whitlock at Barrow Island, Dampier Group, Western Australia, on 17th July, 1918.

Nest in large tussock of sea-grass near springtide line. Very well concealed. Female flushed.

Another clutch, taken on 12th August, 1918, is pure white,

resembling very much the eggs of the White-backed Swallow (*Cheramacca leucosternum*). In another, taken on 9th August, 1918, one egg is quite a different shape from the others of the same clutch, and marked all over with very minute specks of pale reddish-brown, thus giving the clutch an odd appearance. In fact, from the series of eggs it is hard to describe what are typical markings.

Eremiornis carteri. Desert-Bird.

Search for the eggs of this bird has occupied a longer time, probably, than that for any other Australian species. Three unsuccessful seasons were spent by Mr. Whitlock in attempts to locate the nest and eggs, and I determined upon one more hunt before giving in.

As the birds appeared to be more numerous on Barrow Island (Dampier Group, W.A.) than on the mainland, I arranged for Mr. Whitlock to spend some weeks at the spot, during July and August. After a most anxious time (particulars of which shall appear in a later issue of *The Emu*), he succeeded in securing a pair of these long-sought-for eggs on the 20th August. Judging from Mr. Whitlock's experience, eggs of *E. carteri* will always be extremely rare, but he has made the way for other collectors much easier, as his notes will show.

Nest.—The open, cup-shaped nest, substantially built of finely-shredded grass or herbage, and lined with fine roots, was placed in a bunch of spinifex (*Triodia*). Measurements—across, $5\frac{1}{2}$ inches, by $2\frac{1}{2}$ inches deep over all; egg cavity, $2\frac{1}{4}$ inches by $1\frac{1}{4}$ inches.

Eggs.—Type clutch of two eggs: oval in shape, (a) slightly larger than (b); surface of shell very fine and slightly glossy; ground colour pinkish-white, closely covered all over, and particularly at the larger ends, with minute markings of pale lilac and purplish brown, and from light to dark reddish-brown. In (a) the zone or ring of markings on the larger end is more pronounced than in (b).

Dimensions in inches:—(a) .70 x .48, (b) .67 x .48.

The eggs resemble miniature specimens of those of the Bristle-Bird (*Sphenura brachyptera*).

Taken by Mr. F. Lawson Whitlock on Barrow Island, Dampier Group, Western Australia, on 20th August, 1918.

My friend, Mr. Bettington, of "Terragong," New South Wales, is sharing the expense and results of Mr. Whitlock's present expedition.

About Members.

MESSRS. C. H. A. Lienau, R.A.O.U., Unley Park, South Australia, and T. J. Ick-Hewins, M.B., B.S., Taranaki, New Zealand, have been elected members of the Avicultural Society.

Bird Protection in Queensland.

THE following report is taken from the *Brisbane Daily Mail* of 2nd August :—

The Minister for Agriculture (Mr. Lennon) adopted a most sympathetic attitude to a deputation which waited upon him yesterday to plead the cause of Queensland's beautiful and useful birds. The deputation suggested that the old Acts (1877-84) were obsolete, and should be superseded by a measure embodying provisions more in keeping with modern views regarding the value of birds. They put forward a number of clauses as suggestions to be incorporated in the proposed new Act. These included provisions prohibiting the taking of eggs of protected birds, the penalizing of anyone knowingly having feathers (including Egret plumes) or any other portion of protected native game in possession, the prohibition of trapping during birds' breeding season, provision for the better treatment of cage birds and examination of bird dealers' shops, the bestowal of greater powers on honorary rangers, the prohibition of the use of firearms by boys under 16 years, and increases in the penalties under the Act from £1 to £3 (minimum) and £6 to £10 (maximum). In addition, it was suggested that a commission of ornithologists be appointed to advise the Minister in the administration of the Act, to issue printed matter for the enlightenment of the public, and generally to control the interests of birds in relation to agriculture in Queensland, the commission to be purely an honorary one, on lines adopted in certain parts of America.

The Minister, in reply, acknowledged the many complimentary references made to the valuable work he had already done in the matter of bird protection, and said he fully appreciated not only the value of most birds, but the charm they were to the countryside. He had, he said, been very interested in all the deputation had had to say, and he quite agreed with most of the suggestions put forward. These were, however, largely anticipated in a Bill that was already "on the stocks"—a bill making for the protection of both birds and animals. For instance, there were clauses prohibiting the taking of eggs or having in possession the feathers of protected birds, regulations for the control of trapping, and provisions in respect of the power of rangers or guardians. In passing, Mr. Lennon remarked that he knew from personal observation how quickly birds came to recognize places where they were properly treated. On Dunk Island, for instance, where he had been several times, the birds were delightfully trustful and plentiful.

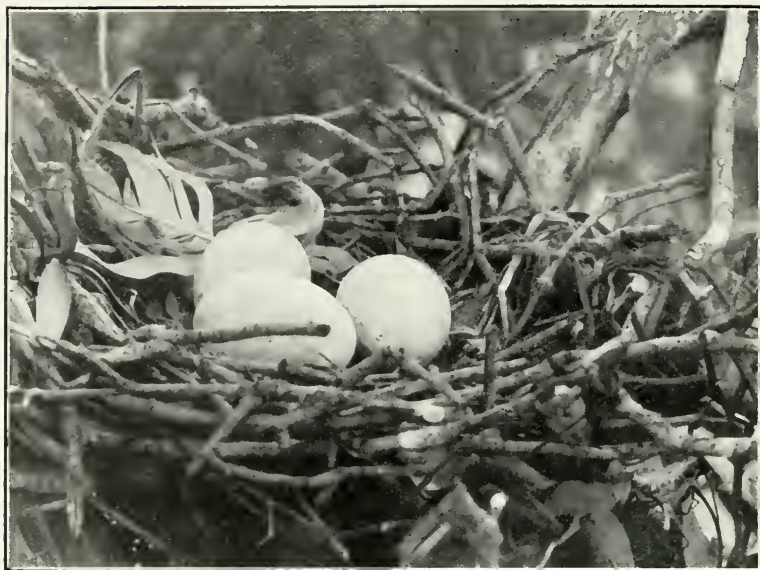
On 9th August Messrs. Henry Tryon (Government Entomologist) and A. H. Chisholm, R.A.O.U., were to have addressed, on behalf of the birds, the annual conference of the associated municipalities of Queensland. At the last moment Mr. Tryon was unable to attend and tell the conference something of his researches into the food of birds, and Mr. Chisholm addressed about

200 delegates, representing all parts of the State. He suggested (*vide Brisbane Courier*) that it would be fair for the conference, after having discussed those birds which came under the ban of bird-pest boards, to give a little kindly consideration to those natives which did valuable work, without reward, the whole year through. It was, he said, within the power of municipalities to help the work of the Agricultural Department by applying to have certain areas under their jurisdiction proclaimed as sanctuaries—cities of refuge where the birds might breed undisturbed by the thoughtless "pot-hunter." He asked delegates to suggest this humane and common-sense action to their respective councils; not to allow any bird to be proclaimed a pest until definite ornithological evidence had been obtained on the point; to help on the valuable work of the Education and Agricultural Departments in endeavouring to bring Queensland into line with other enlightened countries in the matter of bird protection; and generally to safeguard, by way of reciprocation, the interesting, valuable, and beautiful birds in all parts of the State. In reply to a question, the visitor stated that the English Starling (as distinct from the native Starling of North Queensland) was now plentiful in the southern parts of the State. He was not asking for protection for this bird, which, like the Sparrow, should never have been brought to this country; they both drove out more useful native birds and upset the natural balance.

On the following day a conference of delegates from the Bird Pest Boards of the Brisbane, Darling Downs, North Coast, Burnett, and Wide Bay Districts discussed, for the first time, the matter of assisting in the protection of valuable native birds. The executive was directed to report on the subject.

Proposed Refuge for Wild-Fowl.

LAWRENCE Jones and J. Lyle Bayliss, of Lexington, Kentucky, new owners of Jefferson Island, former home of Joe Jefferson, which he named "Bob Acres" after the character in "The Rivals," will turn their 10,000 acres into a sanctuary for birds and other wild life. They have petitioned M. L. Alexandria, Commissioner of Conservation, to set aside Lake Peigneur, which adjoins the property, as a wild water-fowl refuge. They own more than a third of the land circling the lake, and owners of other property have signified their desire that all shooting on the lake be prohibited. As soon as all necessary signatures are received these requests will be complied with, it is said, making the first of a series of interior refuges to be established by the Department of Conservation. It is proposed by the new owners of "Bob Acres" to spend several thousand dollars on the property to make it a bird haven. A dam will be constructed on the edge of the lake to re-establish a former cypress



Nest and Eggs of Yellow-billed Spoonbill (*Platibis flavipes*).
See *Emu* for description, vol. xviii., p. 46, and Plate XI.

PHOTO. BY D. LE SOUEF, C.M.Z.S.



The Lesser Frigate-Bird (*Fregata ariel*).

PHOTO. BY CLYDE F. ELLIS.

swamp that has been drained. After the water has been put on this land, an immense Heronry will be started, so that the different Herons of the State, particularly the Egrets, may build their nests and raise their young in normal surroundings. Other innovations will be put in to attract water and insectivorous birds.—*The Christian Science Monitor*.

Camera Craft Notes.

MR. H. Gundersen, formerly Norwegian Consul, Melbourne, sends an excellent "snap" of the Lesser (or, rather, Least) Frigate-Bird (*Fregata ariel*, Gould), on a banana plant. The photo. was taken by Mr. Clyde F. Ellis, at Tahiti, Society Islands—probably about the eastern range of the species. The bird appears to be in immature plumage.—A. J. CAMPBELL.

Stray Feathers.

Foxes and Plovers.—Mr. W. M. Brennan, Forestry Department, Moree, N.S.W., states that the fox has practically killed out the Stone-Curlew and Spurwing Plover in his district; also, Magpies occasionally pick up the baits set for foxes, and so themselves succumb. He found two of these birds dead from this cause lately. He notices that many of our insectivorous birds are slowly but surely disappearing.

* * *

Queensland Bird Protection.—We are glad to notice that the Queensland Government has placed the Grass (*Psephotus*) and Ground (*Euphema*) Parrots, under the *Native Birds Protection Act* 1877-1884, amongst the birds for which total protection is provided. This has been done at the instance of one of the Queensland members of our Council, Mr. A. H. Chisholm, Brisbane. Also that Peel Island, in Moreton Bay, has been proclaimed a "bird reserve." Mr Chisholm has lately been appointed an honorary ranger for the preservation of native Queensland birds.

* * *

Trinomials.—Arising out of the din of the battle, binomials *v.* trinomials, one sometimes hears that the latter are an innovation of modern times, and quite unnecessary. But once again Tasmania can claim to lead the world. According to Dr. Milligan's "Vocabulary," the tribes of the north and north-western coasts of Tasmania over a century ago commonly spoke of the Bald-Coot as "*Lugoileah mungoinah leah*." And yet the early settlers claimed that the Tasmanian blacks were an uncivilized race, and wiped them off the face of the map!—CLIVE E. LORD, R.A.O.U. Hobart, 20/8/18.

Great Brown Kingfisher and Heron.—A day or two since I was walking along a forest gully when I heard simultaneously the pained screech of a White-fronted Heron and the boastful laugh of a Jackass, and saw both birds fly from the ground, the Heron apparently injured. At a small pool in the sandy gully there were two splashes of blood on the sand, and the water was bloody. The Jack had evidently made a wanton swoop at the Heron, and then flew, with the boastful laugh, to his mate, seeming to say, "I put in one on him, anyhow."—J. R. CHISHOLM. *Prairie Table-land, North Queensland.*

* * *

Crested Bell-Birds and Caterpillars.—I was interested in the remarks upon this subject in the last *Emu*. During my many trips and expeditions into the interior I have examined hundreds of Bell-Birds' (*Oreoica cristata*) nests, but never once, where the nest has been occupied by eggs or young, have the caterpillars been absent. I am not at all sure that the Crested Bell-Bird does not eat these caterpillars, for heads of caterpillars are found in numbers in their stomachs, and I know for certain that these very caterpillars are eaten in great numbers by the Pallid Cuckoo.—S. A. WHITE. "*Wetunga*," Fulham, S.A., 19/9/18.

* * *

Nests of Banded Finches.—Banded Finches (*Sticteptera bichenovii*) frequently nest in our garden in the spring of the year, and the interesting part of it is that they invariably choose an orange or lemon tree in which to build. One tree is a special favourite, apparently because the leaves are denser, and last year nine pairs of these little birds built in it. This shows one that all these nine pairs of birds had the same thought running in their minds when they were choosing the nesting tree, otherwise why should they have all chosen the same one? It could hardly be for company, as other trees were close by, and in them also were two or three nests. I have never noticed so many nests of these birds on one tree anywhere in the bush, although I have often found a single one.—MARY CURWEN-WALKER. "*Midken*," *via* Moree, N.S.W.

* * *

Tasmania's National Park.—It may interest the readers of *The Emu* to know that Tasmania has now a National Park. This is to be an absolute sanctuary for the fauna of the island, and, although such a reservation was practically a necessity, it took years to obtain. The reserve embraces an area of 27,000 acres, and includes practically the whole of the Mount Field Range, about 50 miles north-west from Hobart. It also includes the famous Russell Falls. Several fairly large lakes and numbers of small tarns are included in the area. Certain forms of bird-life are very plentiful on the mountain slopes, and their numbers will doubtless increase as soon as the birds recognize that the area is

a sanctuary. And all animals soon discover such localities. The park has only been proclaimed a few months, but already the wallabies can be seen occasionally in localities near the entrance, where they have not been seen for years.—CLIVE E. LORD (member National Park Board). Hobart, 17/8/18.

* * *

Swifts and Weather.—The summer just past has been remarkable for its warmth and dryness. For practically six months we have had sunny, genial weather, very little wind, and only a few showers; and even now, entering the second week of May, the atmosphere is warm and the ground almost as dry as the proverbial chip. The season has also been remarkable for the absence of the Spine-tailed Swift (*Chatura caudacuta*) from our North-West Coast, in this forming a marked contrast with last summer (1917—see *Emu*, vol. xvii., p. 223), when the birds were seen all through February and March until the third week of April. During the present summer not one individual came within ken of either my friend Mr. Will Buck or myself. We both spend a great deal of time out of doors, and keep a constant look-out. I heard of the Swifts being seen on two occasions—once during first week of April between Don and Spreyton, and once the week following between Mersey Heads and Bluff; they must then have been leaving for the Northern Hemisphere.—H. STUART DOVE. West Devonport, Tasmania, 8/5/18.

* * *

"Shamming Sick."—An interesting episode was witnessed by a friend and self while driving through the Harford and New Ground districts recently. One part of the road was bordered by bush on one side and by a partly-cleared paddock on the other. A Dusky Robin (*Petroica vittata*) flew across from the bush, just in front of us, alighted at a hollow in a dry tree within the paddock, and instantly left, minus the grub which he had carried in his bill. I jumped out of the trap, and on reaching the tree found the female bird on the nest. Directly she caught sight of me she tumbled from the nest to the ground, fluttered along with the greatest difficulty, then on to a log, the length of which she progressed in the same painful fashion. On returning to the nest, I found she had been brooding two greenish-blue eggs with an orange tint at one end. The male bird, after feeding her on the nest, had flown to the side of a tall stump, where he clung while watching the farce of his mate leading away a "tenderfoot." Our "Dusky" is quite as good at this acting business as is the familiar little White-fronted Chat.—H. STUART DOVE. West Devonport, Tas. 3/9/18.

* * *

The "Whisper Song."—Our trans-Pacific cousins have bestowed a good deal of attention of late years on that low, sweet melody uttered at certain seasons by certain species, and christened very

appropriately the "whisper song." Allusions to many kinds of birds which have been heard singing thus in various parts of North America may be found in the organ of the Audubon Society—*Bird-Lore*. My introduction to this class of song took place years ago, while living to the west of Table Cape, North-West Tasmania. One warm afternoon I was spending an hour in the garden which we had planted "on our selection," and in which the fruit-trees had grown to a fair size. A sweet melody, containing some rich notes, fell upon my ear; it gave the impression of a rather large bird singing in the distance, and I had listened to it for some time before it struck me that the performer might be closer at hand. I then traced it to a nut-bush only a couple of yards or so away, and on peering into this saw, ensconced in the shady centre of the bush, a White-eye (*Zosterops carulescens*) warbling away as if purely for his own enjoyment. So wrapped up was he in this quiet, inward melody that he took no notice of my presence, and I was able to enjoy the song for some minutes longer.—H. STUART DOVE. West Devonport, Tas., 14/8/18.

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Maternal Courage.—While walking at the Mersey Bluff, North-West Tasmania, during the first week of January, I noticed the nest of a Wood-Swallow (*Artamus sordidus*) in a small fork near the end of a pine branch, and went under the branch, which was 10 or 12 feet above the ground, to inspect. The sitting bird immediately left the nest, rose up in an oblique direction to a distance of about 15 feet from the branch, then swooped toward me, passing over my head and just missing the white helmet which I wore. The impetus of the descent carried her a good distance in the opposite direction, whence she returned to the first aerial position, swooped again (just missing my hat), and continued the manoeuvre until I left the spot. This is the first time that I have known an *Artamus* come near to making an attack on a human being, much in the same way that the Skua does in the Shetlands of the north. A pair of Superb Warblers (*Malurus longicaudus*) built in my garden during December in some long grass about the stem of a small cherry tree, and laid four eggs during successive days. After incubation had proceeded awhile something disturbed the nest during one night, and in the morning the eggs were out on the grass just beneath. When I stooped to replace them, the female Warbler perched on the nest close to my hand, scolding away very heartily, and remained there until my retirement.—H. STUART DOVE. West Devonport, Tasmania, 27/2/18.

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White-tailed Black Terns (*Hydrochelidon leucoplera*) in Western Australia.—In *The Emu*, vol. xvii., p. 95, I recorded the visit of large numbers of these birds to South-Western Australia in March, April, and May, 1917. I described this occurrence as "a remark-

able visitation " in view of the fact that only occasional specimens had previously been met with in Australia, in the extreme north of the continent. The Hon. Mr. Justice Burnside informs me that birds of this species again appeared in the neighbourhood of Perth in April, 1918. He states that on Sunday, 21st April, there was a very heavy blow from the north, and two days later, on 23rd April, he observed one of these birds flying round his yacht, anchored in Freshwater Bay, on the Swan River. On the following Sunday, 28th April, when anchored in the yacht off Applecross, on the Swan River, he and his companion, Mr. W. A. L. Knox, saw a great number of them flying about over the river. They were apparently mostly adult birds, the black on the under side being very clear and uniform in colour. Mr. Burnside frequently saw them on the river subsequently, but they disappeared when winter weather set in in May. I may mention that it was when on Mr. Burnside's yacht that I first met with these birds, as recorded in my previous article, and that he subsequently secured several specimens for me, also that Mr. Knox was present on these occasions, so that both these gentlemen are thoroughly familiar with these interesting birds, and there can be no doubt as to the occurrence, though no specimens were secured on this occasion.—W. B. ALEXANDER. Queen's College, Melbourne.

* * *

A Skua and his Victims.—While cruising near Wright Island in the *Ripple*, with Mr. C. Roberts, during the month of April just past, we were entertained by watching the manoeuvres of a Richardson Skua (*Stercorarius crepidatus*) to obtain food without the labour of diving. There were dark patches on the surface of the sea, indicating the presence of shoals of small fish, and over these many Crested Terns (*Sterna bergii*) were hovering, ever and anon making their shallow dives, or in some instances appearing to pick small fry off the surface. As soon as one had obtained a sufficient cargo and left the hunting-ground he was chased by the pirate Gull and forced to disgorge. The power of flight of the Skua was wonderful. The graceful Tern is no mean performer in the air, but, no matter what turns and twists he made, the pursuer was always there, swooping like a Hawk, until the luckless pursued dropped his fish, when the Gull immediately fell to the surface of the water, gobbled up the spoil, then rose to pursue another victim. The Richardson Skua is not a large bird—the one we saw appeared two or three inches longer than the Tern, but of much more robust build—of a dark brown plumage, and the long central rectrices were very prominent as he flew above the yacht. Mr. A. J. Campbell, in "Nests and Eggs," says that he first saw this species in Port Phillip in 1883, when returning from Tasmania, and has noticed them several times since, but always in summer. It must be a very occasional visitor to our North-West Coast, as this is the first time either

my friend or myself has seen it at work here, although we do a good deal of boating, and there is almost always a party of Terns within ken carrying on fishing operations. The Great Skua (*Megalestris antarctica*) we have never seen here.—H. STUART DOVE. West Devonport, Tasmania, 8/5/18.

On the Occurrence of the Australian Roller (*Eurystomus pacificus*) in Tasmania.

BY CLIVE E. LORD, R.A.O.U., TASMANIAN MUSEUM.

I HAVE received from Mr. George Hinsby, of the West Coast, the skin of a Dollar-Bird (*Eurystomus pacificus*), which Mr. Hinsby informs me was shot near Crotty. I have heard reports that a specimen of this species was shot on the North-West Coast of Tasmania about six years ago, but I do not know of this being placed on record nor have I seen a specimen, other than the one forwarded by Mr. Hinsby, which had been obtained in Tasmania. I consider that the specimen recently obtained, and which is now in the Tasmanian Museum, is the first to be duly recorded from Tasmania. It can therefore be placed on the Tasmanian list, but for the present will have to be treated as an "accidental."

Additions to the Library.

BY W. B. ALEXANDER, M.A., HON. LIBRARIAN.

PRESENTATIONS.

- "Birds of Australia." W. Bröinowski. Presented by Dr. J. A. Leach.
- "Wonders of the Bird World." R. Bowdler-Sharpe. Presented by W. B. Alexander.
- "Re-naming Australian Birds: Is it Necessary?" A. J. Campbell. Pamphlet presented by the author.

PURCHASES.

- "Insectivorous Birds of Victoria." Robert Hall.
- "Bird-Life." W. P. Pycraft.
- "Gum Boughs and Wattle Blossom." Donald Macdonald.
- "From Range to Sea: a Bird-Lover's Ways." Charles Barrett.

PERIODICALS RECEIVED IN EXCHANGE.

- British Birds*, vol. xi., parts 4 and 12.
- Avicultural Magazine*, vol. ix., parts 6, 7, and 8.
- Ibis*, vol. vi., part 2.

- South Australian Ornithologist*, vol. iii., part 7.
Condor, vol. xx., part 3.
Austral Avian Record, vol. iii., parts 4 and 5.
Bird Lore, vol. xx., part 3.
Revue Francaise d'Ornithologie, No. 108 and 109.
Proceedings of Royal Society of Victoria, vol. xxx., part 2.
University of California Publications in Zoology, vol. xvii., parts 14, 15, 16, and 17; vol. xviii., part 13.
United States National Museum Bulletin 100.
Proceedings of Linnean Society of New South Wales, 1918, part 1.
Australian Naturalist, vol. iv., part 3.
Hawkesbury Agricultural College Journal, vol. xiv., part 12; vol. xv., parts 6, 7, and 8.

ARTICLES IN THE FOREGOING PUBLICATIONS DEALING WITH
AUSTRALASIAN BIRDS.

- "A Visit to the Breeding-Grounds of Swan and Pelican on the Coorong," by S. A. White. *South Australian Ornithologist*, vol. iii., part 7, p. 198.
 "Some Observations on the Nesting and the Young of Cormorants," by A. M. Morgan. *South Australian Ornithologist*, vol. iii., part 7, p. 201.
 "Living *versus* Dead Names for Australian Birds," by A. J. Campbell. *South Australian Ornithologist*, vol. iii., part 7, p. 211.
 "The Re-Discovery of two Lost Birds," by G. M. Mathews. *Austral Avian Record*, vol. iii., part 4, p. 79.
 Deals with Mr. T. Carter's discovery of *Malurus leucopterus* and *Diaphorillas textilis* in their type locality (see *Emu*, xviii., p. 60).
 "On a Collection of Birds from the Macleay Museum, Sydney, N.S.W.," by G. M. Mathews. *Austral Avian Record*, vol. iii., part 4, p. 95.
 "Silvester Diggles, Ornithologist," by G. M. Mathews. *Austral Avian Record*, vol. iii., part 4, p. 98.
 "The Protection of Bird-Life," by Sir Joseph Carruthers. *Avicultural Magazine*, vol. ix., part 8, p. 232.

A reprint of an article by the former Premier of New South Wales from the *Sydney Daily Telegraph* of 12th October, 1917. Sir Joseph urges that protection of birds is specially desirable in Australia at the present time owing to their usefulness in destroying mice and insects which destroy crops, and thus diminish the world's food supply.

ARTICLES OF GENERAL ORNITHOLOGICAL INTEREST.

"A Note on the Structure of the Feather," by J. S. Gladstone. *Ibis*, vol. vi., part 2, p. 243.

"The Birds of the Isle of May: a Migration Study," by Misses E. V. Baxter and L. J. Rintoul. *Ibis*, vol. vi., part 2, p. 247.

A valuable contribution to the study of bird migration, especially with regard to the influence of weather conditions and winds on the movements of birds.

"Development of Pattern in Birds," by A. G. Butler. *Avicultural Magazine*, vol. ix., part 6, p. 182.

"Diseases of Birds and Their Treatment and Cure," by P. F. M. Galloway. *Avicultural Magazine*, vol. ix., part 6, p. 192, and part 7, p. 217.

"Ancestral Characters in Nestlings," by A. G. Butler. *Avicultural Magazine*, vol. ix., part 7, p. 211, and part 8, p. 234.

"Birds in the Valley of the Ancre during the Winter 1916-17," by Capt. J. N. Kennedy, M.C., Australian Corps Heavy Artillery. *Revue Francaise d'Ornithologie*, No. 109, p. 241.

The author records his observations on 56 species, and notes the effects on them of the fighting and of the unusually severe winter.

Correspondence.

To the Editors of "The Emu."

SIRS,—In *The Emu*, vol. xvii., part 4, page 177, Mr. A. J. Campbell makes the following remark respecting the Black-and-White Wren (*Malurus edouardi*) from Barrow Island:—"If so, I fear my friend, Mr. Carter's, claim to re-discovery has been anticipated." This refers to the paper by Mr. G. M. Mathews and myself in *The Ibis* for October, 1917, wherein (on page 593), under the heading of *Nesomalurus leucopterus leucopterus*, we stated:—"After an interval of nearly one hundred years the original *Malurus leucopterus* (Dumont), subsequently figured by Quoy and Gaimard, has again been obtained in the locality where the type specimen was got in 1818—namely, Dirk Hartog Island." Surely Mr. Campbell cannot deny that this claim has been fulfilled, and his remark in *The Emu* appears to be a contradiction to the letter that he wrote to me last year (1917), in which he congratulated me "on the re-discovery of the original Black-and-White *Malurus* and *Amytornis textilis*." As to whether *M. edouardi* is subspecifically distinct from *M. (Nesomalurus) leucopterus* or not, all I can say at present is that Mr. G. M. Mathews and myself think that it is, and Mr. W. B. Alexander, of the Perth Museum, is of the same opinion, as he wrote to me, on receipt of the first two skins sent to him from Dirk Hartog, pointing out the differ-

ences between them and the Museum specimens from Barrow Island, which differences were subsequently confirmed by comparison with other specimens obtained (from Dirk Hartog).

Mr. Campbell also states in *The Emu* for April, 1918 (p. 178) :— "There is no reason why a species on separate islands should change." Perhaps there is no known reason at present, but they certainly *do* change on islands comparatively close to one another, because, as stated in *The Ibis*, October, 1917 (p. 593), the Dirk Hartog form of *Malurus assimilis* distinctly differs from *Malurus bernieri* (Grant), of Bernier Island, the southern extremity of which is forty-five (45) miles from the northern end of Dirk Hartog.

As to Mr. A. J. Campbell's original description of *Malurus edouardi*, perhaps he is not aware (or has forgotten) that it was through my agency that he was able to make it, as on 14th February, 1901, when I was paying a visit to Perth from Point Cloates, I was shown in the Perth Museum the skins of this bird, then recently obtained by Mr. J. T. Tunney, and at once recognized that they were of great importance; and, as the late Mr. Bernard H. Woodward was absent at the time, I told the official to urge strongly upon Mr. Woodward the necessity of having the skins at once described, and advised that they should be sent to competent authorities in the Eastern States for comparison with their larger series of specimens there. I sailed for the North-West a day or two afterwards, without being able to see Mr. Woodward, and by first mail leaving Point Cloates after my return there—viz., on 12th March—I wrote to both Mr. A. J. Campbell and Mr. Woodward respecting the skins.—I remain, &c.,

TOM CARTER.

"Wensleydale," Mulgrave-road, Sutton, Surrey,
England, 19/6/18.

[There is no question that Mr. Carter, by his enterprise and bushcraft, re-discovered *Malurus leucopterus* in its original habitat. But if *M. edouardi* be a sub-species of *M. leucopterus* (Mathews has it so in his "1913 List," p. 229), then the discovery of *M. edouardi* was a re-discovery of the *species*.—EDS.]

To the Editors of "The Emu."

SIRS,—May I be allowed to add a slight tribute to those which have already appeared in *The Emu* to the memory of the late Colonel W. V. Legge. At the time when I first arrived in the island from Great Britain, and, having settled in the bush, was striving to attain to some knowledge of our avifauna without any literature on the subject, the Colonel very kindly sent me one of his few remaining copies of the "Systematic List of Tasmanian Birds," printed in 1886, and, some years later, his "Memorandum Relative to a Vernacular List," printed in 1895. Besides these,

I had at various times communications from the Colonel, giving information on obscure points connected with the life or classification of our bush birds.

The passing away of this distinguished ornithologist is a heavy loss, not only to our island, but to Australia generally.

H. STUART DOVE.

West Devonport, Tasmania, 5/8/18.

Reviews.

["The Food of Australian Birds." New South Wales Department of Agriculture Science Bulletin No. 15.]

THIS very important bulletin contains the results of investigations of the stomach and crop contents of birds carried out in New South Wales by Dr. J. B. Cleland, Mr. J. H. Maiden, Mr. W. W. Froggatt, Dr. E. W. Ferguson, and Mr. C. T. Musson. The main portion of the work has been written by Dr. Cleland, and consists of an introduction, "Broad Summary of Results," "Detail Summaries and Verdicts on Individual Birds," "Food of Birds from Botanical Aspect," and "List of Birds Feeding on Particular Foods." Following this are three appendices. The first of these consists of a tabulated summary of the contents of stomachs and crops of each species of Australian bird examined, whilst the two others give actual details of the contents found in the stomachs and crops of all the individual birds. Altogether, the contents of the stomach or crop of one or more individuals of 220 species of native birds and 4 species of introduced birds are tabulated. As Dr. Cleland truly remarks in the introduction, "the appendices should prove of great value to future workers in this interesting economic field, inasmuch as they form a basis showing the food of individual birds, which can be added to from time to time as further birds are examined." He adds:— Obviously, before any individual species of birds can be rightly assessed economically from the point of view of its food habits, a large number of individuals, preferably several hundreds, must be examined in detail." After this it must come as a surprise to readers to find that the author proceeds to give a verdict on almost all species of birds, even when only a few stomachs have been examined. For example, of the Dollar-Bird, of which four stomachs were examined, he writes:—"This is evidently a very useful species." Of the Laughing Kingfisher, of which three stomachs have been examined:—"It is obviously a very useful species." Whilst not denying the great value of the work accomplished, we think no judgments should have been pronounced until at least 50 specimens of the species from different localities and killed at different seasons had been examined. At present more than 50 specimens have been examined in only three species—the Silver-eye (*Zosterops cerulescens*) and the introduced Sparrow

and Starling. The examination of 53 Silver-eyes from seven localities, in eight different months, indicates that they are useful in the winter time, destroying many insects, but when in flocks in the summer they do much damage to soft fruits, such as figs, grapes, and persimmons. Of 127 Sparrows examined, all but two were from Richmond, and the month in which they were killed is not recorded. The verdict is that they are "a pest anywhere, in spite of the fact that they eat many insects." But surely, though the pamphlet is called a science bulletin, it is somewhat unscientific to examine 125 birds in one locality and then say they are "a pest anywhere." It may be quite true, but the bulletin purports to be the result of a scientific investigation, and not an expression of the author's opinions.

The examination of 73 Starlings' stomachs resulted in the discovery of wheat grains in three and fruit in one, the remainder chiefly containing insects. In his "Detailed Summary and Verdict" the author says:—"This result, however, does not by any means indicate clearly the destructive tendencies in the direction of vegetable food, as the accessibility of such food must be considered at the time the bird was shot. Unquestionably Starlings feed greatly on cultivated fruits and on cultivated grains during the season when these are available. . . . Summed up, it may be stated that the Starling does marked harm to fruit gardens, and that it does some harm to crops, but that it does some good in destroying certain insect pests, such as cut-worms, when these are present in abundance and perhaps other food is scarce. . . . Its virtues are unquestionably less than its defects, and no encouragement whatever should be given to its appearance in any part of the country." We see in this case that the author deliberately sets aside the evidence he has collected and gives a verdict founded on his preconceived ideas. We do not maintain that his verdict is wrong, but we think it is decidedly misleading to state in the "Broad Summary of Results" that the Sparrow and Starling "do much more harm than good." The "results" as regards the Starling are exactly opposite. The only result which it seems to us has been reached is to show that many hundreds must be examined before any safe conclusion can be drawn.

We would like to suggest that in future work percentages of the different classes of food found should be given, as is the custom of modern workers in America and Europe. In an economic investigation what is wanted is a knowledge of the main character of the food—*e.g.*, seeds of crops 3 per cent., weed seeds 19 per cent., insects 53 per cent., indeterminable 25 per cent., at once indicates the habits of the bird without overloading the account with details of each species of insect found.

In spite of these criticisms we desire to express our appreciation of the great amount of painstaking work which has gone to the making of the bulletin, which should certainly be studied by every Australian ornithologist.—W. B. A.

"TROPIC DAYS."

["Tropic Days," by E. J. Banfield, author of "The Confessions of a Beachcomber" and "My Tropic Isle"; with 37 illustrations. London: T. Fisher Unwin Ltd. 8vo. pp. 313. Price, 16/ net.]

OUR member and versatile writer, Mr. E. J. Banfield, of Dunk Island, North Queensland, is the author of another new book. It has been noticed that three rolling billows, greater than the surrounding sea, frequently follow each other, so on "Beachcomber" Banfield's bay there have been three literary waves—his "Confessions," his "Tropic Isle," and now his "Tropic Days." The last book, due, no doubt, to dire war time, does not aim at being so pretentious as either of its forerunners. It is dedicated to his "brother beachcombers, professing, practising," and is divided into three parts—"Sun Days," "The Passing Race," and "Miscellanea."

With the exception of one or two chapters in Parts II. and III., the chief interest for the field naturalist is centred in Part I., which might be called "Halcyon Days"—winter and spring upon a salubrious, verdure-clad, hill-topped islet, where one wears a truly *dolce far niente* air, and is surrounded by all that is lovely and free in nature. Of course, mosquitoes, sand-flies, scrub-ticks, and other tropical pests never enter into the poetry of the situation, nor does the season of cyclones, oft with death and destruction.

Mr. Banfield's style, always graceful, being poetical, imaginative, and ethical, lends itself especially to nature subjects.

"Beach Plants" is a poetical chapter, where sighing sheoaks (Casuarinas) are called "the harps of the beach," and sea-coast laburnums have leaves of loveliness, "hoary with silvery fur as soft as sealskin," and convolvuli creep "with tireless tentacles." Of wattles, "the young shoots of *Acacia flavescens* are covered as with a golden fleece, and its globular flowers are pale yellow. *Acacia aulacocarpa* (hickory wattle) displays in pendent masses golden tassels rich in fragrance," while a huge "wind-tormented fig-tree supporting other trees, epiphytal orchids, and ferns not a few, is a pillar of flora in itself." "Fragrance and Fruit" makes a charming word-picture. "Quiet Waters" is descriptive of the reaches of a river on the mainland opposite to Mr. Banfield's island home, where the mangroves that margin the stream are inflorescent during October "with hawthorn-like flowers breathing perfume as from an orangery." "Snake and Frog Prattle," an evergreen subject, makes a "creepy" chapter, and the one on "Pearls" is instructive.

The publishers are possibly not serious when they claim that the ethnology will appeal to those "especially interested." In the gracefully worded strands of these silky stories one does not know whether fact, fiction, or legend is intended by the author.

Adverting again to birds, it would have been interesting to R.A.O.U. members had Mr. Banfield given the ornithological name of the "cheeky" Honey-eater that invaded his premises

after ripe bananas. Possibly it was a northern variety of the Yellow-eared Honey-eater (*Ptilotis lewinii*). The Fasciated Honey-eater (*P. fasciogularis*) is mentioned once or twice. Is it an accepted fact that this mangrove-loving bird is found so far north? "Moor-goody," Mr. Banfield informs us, is the blacks' name for a Shrike-Thrush; is it the larger or smaller rufous kind? Possibly the latter, *Colluricincla praxissima*—a sweet-voiced songster.

"Tropic Days" is illuminated by a selection of choice photographs taken by the author's friends—D. Le Souëf, W. E. Perroux, and Caroline Hordern. Two pictures—"Macaranga" plants and "Cycad and Palms"—above the last-mentioned name verily breathe the "spirit of the bush."

THE TUBINARES.

PROFESSOR Leverett Mills Loomis, Director of the Californian Academy of Sciences, is the author of an important memoir, being "A Review of the Albatrosses, Petrels, and Diving Petrels," including an account of the expedition of the Academy to the Galapagos Islands, 1905-6. It is "the last word," in a double sense, on the great and interesting order Tubinares (tube-nosed swimmers), and for an academic production is free from pedantry, and vernacular names are liberally employed; this is appreciated by the "man in the street," without detracting in the least from the scientific value of the work.

The work opens with a "Historic Sketch" of the periods—Couesian, Salvinian, and Godmanian—with portraits of these respective authors. Then follow "Geographic Distribution"—areas, super-areas, sub-areas; "Migration"—in the southern hemisphere, in the northern hemisphere, &c.; "Variation"—age, seasonal &c.; "Classification and Nomenclature," and concludes with "Remarks" on the species of the Pacific Ocean adjacent to North America and the Galapagos.

Professor Loomis's definition of a "species" is very concise, and his "Groups of Species" instructive, while he is delightfully frank on "The Sub-Species Question." "In theory," he states, "sub-species are incipient species; in fact, sub-species are attempts to forecast the future geographical variation, which no one can see. Naturally, much difference of opinion has arisen in the application of the sub-species theory. Some ornithologists would differentiate all discernible geographic variations into sub-species; others would make selections and have 'practical sub-species.' Under the first method the separations become so fine that even typical examples can scarcely be determined. Under the second method the separations rest largely on the shifting sands of individual opinion. It is obvious that the sub-species theory has complicated, not simplified, the study of birds. Nevertheless, the theory has served a highly useful purpose; it has revealed to ornithologists geographic variation, which is a variation within

the limits of the species. In the present paper geographical variation is considered in connection with the other variations of species, the sub-species theory being discarded as a theory that has outlived its usefulness."

As the memoir deals with the whole of the Tubinares, all Australian species are more or less mentioned, and numerous annotations will have to be sifted by the R.A.O.U. Check-list Committee. Some of Prof. Loomis's deductions do not altogether agree with Mr. G. M. Mathews's latest pronouncements on the species. Mr. Mathews has revived *Diomedæa epomophora*, Lesson, for *Diomedea regia*, Buller, dilating on the shape of the bill as a diagnostic character. The examination of an extensive series shows that the individuals of Tubinarine species are subject to much variation in form and size of bill; also that Gould's name, *D. culminata*, should be retained instead of Forster's *D. chrysostoma*. Gould's name, *Pterodroma (Estrelata) solandri*, should not be rejected in favour of Gmelin's *P. melanopus*, because the former's type and description appear to be more certain of the species.

According to Prof. Loomis, the evidence against *Puffinus gavia*, Forster, is not conclusive, for which species Mr. Mathews proposes his own new names *Reinholdia reinholdi*. There are other instances where "doctors differ." But it may be observed here that Prof. Loomis lists the Spectacled Petrel (*Majaqueus conspicillatus*, Gould) as synonymous with the White-chinned Petrel (*Procellaria æquinoctialis*, Linn.)

One of the surprises of the Galapagos expedition was the interesting discovery of the Black Petrel (*Procellaria parkinsoni*, Gray)—a species hitherto supposed to be peculiar to Australasian seas.

A sketch chart of the oceans accompanies the memoir, also interesting reproductions of the Galapagos Albatross nesting and of the light phases and dark of the Wedge-tailed Petrel (*Puffinus chlororhynchus [sphenurus]*), &c. Not only American but Australian ornithology will be benefited by Prof. Loomis's practical piece of research, which is published by the Academy and printed from the "John W. Hendrie Publication Endowment."

Monthly Conversazioni of R.A.O.U.

THE July conversazione of the R.A.O.U. was held at Temple Court, Collins-street, on 3rd July, Dr. Leach occupying the chair. The subject for the evening took the form of a debate on "Re-naming Australian Birds: is it Necessary?" Mr. A. J. Campbell introducing the discussion and taking up the position that priority should not go back further than the days of Gould. Mr. W. B. Alexander, M.A., and Mr. A. H. E. Mattingley opposed these views, and other members had an opportunity of expressing their opinion at the conclusion of the debate.

Mr. Campbell said that there was no invincible reason why Australian birds—endemic species, at least—already correctly

named (*i.e.*, scientifically), except for the so-called law of priority, should be re-named. He endeavoured to prove that nomenclature was not a science, but a system merely, and that ornithological science should not revolve around nomenclature. He stated that the so-called law of priority cannot stand, being arbitrary and inconsistent in itself. He gave instances where ornithologists sought to resurrect ancient and obsolete names and to bury living present-day ones, and asked what scientific purpose is served by digging out prior names, some of which perpetuated egregious error. He went on to say that after much dispute between British and American scientists the 10th edition of Linné was accepted, and that nomenclature prior to this should be excluded. Australian ornithologists were not represented on this International Zoological Conference, and therefore were not bound by its findings. This being so, he asked, "What has the Linnean law of priority to do with Australian ornithology, the nomenclature of which is almost entirely of post-Linnean authors?" The so-called law of priority does not say where Australian ornithologists should begin—with Gould, or any other author, or at any specified time; therefore it is not inconsistent with the law of priority to use any Gouldian name if it be ornithologically correct.

Mr. Alexander pointed out that the rules of nomenclature that Mr. Campbell objected to were those arrived at by the International Conference of Zoologists, and that Australia was represented thereupon, in that the leading naturalists of Australia were members of the chief scientific societies of the Empire—the Royal, Linnean, and Zoological Societies and the British Ornithologists' Union—and these societies were represented. Moreover, the agreement was reached in regard to all scientific names in all branches of zoology, and it would be absurd to create a special rule for Australian birds different from that prevalent in all other countries for birds, and in all countries for mammals, fish, insects, and other groups of animals. The reason why the law of priority did not extend to authors ante-Linnean was that Linnæus was the originator of binomial nomenclature; this, however, did not apply here, as no Australian birds were known to Linnæus. Therefore, the first name given to an Australian bird was the correct one. Gould himself was a thorough believer in priority, and in his "Handbook" altered many of the names given in his "Birds of Australia" in favour of those given to the same species by earlier authors. Mr. Alexander instanced three different classes of names in the present R.A.O.U. "Check-list" that he considered required alteration—(1) certain generic names, *e.g.*, *Phalacrocorax*, covering birds showing considerable differences of structure, which could be grouped in several genera with advantage; (2) distinct specific names applied to certain birds closely related to those of other countries, *e.g.*, *Strix delicatula*, the Australian representative for the European Barn Owl; (3) specific names which had been shown to be incorrect, *e.g.*, *Fregata*

aquila for the Greater Frigate-Bird. This name was given to the Ascension Island Frigate-Bird, which was quite a distinct species from that inhabiting Australian seas; hence another name must be found for the Australian bird. Changes of this nature were, of course, in addition to those demanded by the law of priority.

Mr. Mattingley stated that he would confine his remarks to the broader aspect of the case, which will be helpful to those that deal with ornithology from a popular point of view. To this end he gave a very compressed account of the reason for the use of nomenclature as applied to ornithology. All admit that birds are distinguished from other animals, hence the need of placing them in a separate class. Next, we must inquire how they are related, and separate those that are like from those that are unlike. Nearly every leader of ornithology has introduced his own system. Naturally, a harvest of confusion has been reaped, and but little golden grain garnered. Remodelling has been rendered necessary. We have to construct the family tree or genealogical table, which will show the affinities of birds—*i.e.*, indicate their genetic or blood relationships, and establish them with as few breaks as possible, after investigating their structural affinities or morphological characters. For convenience, stability, and harmony, biologists have invented an arbitrary naming of these groups, such as class, order, family, genus, and species, which they have further subdivided. For the absolute fixity in and basis for names, the International Congress of Zoological Nomenclature chose the 10th edition of Linnæus. The acceptance of this rule, which I strongly urge you to support, aims at the prevention of future haggling, and should attain a fixity in designation for organized beings. The strongest feature of the International Code is what is known as the law of priority. By this law the correct name for any bird is that given by its first describer. The British and United States Governments have dropped their insularism and have standardized their ship-building, munition and air-craft factories, to cope with the vast problems set by the war. Zoological science also requires this standardization and organization. Australians, much as they respect Mr. Campbell as a pillar of Australasian ornithological science, cannot follow Mr. Campbell's contentions and disjoint the vertebræ of zoological science.

Dr. Nicholls, Messrs. A. G. Campbell and F. E. Wilson also took part in the discussion.

The chairman congratulated the debaters on providing an educative and instructive evening. He could not agree with Mr. Campbell. Gould's position in Australia was not analogous to that of Linnæus, the founder of binomial nomenclature in the Old World. Gould changed in the "Handbook" names used in the "Birds of Australia." Mr. Campbell limited his proposal to endemic species. These species of the Australian avifauna, which contains representatives of "every widely-spread family

of birds but two," belong largely to families and genera represented elsewhere, and we could not use a different family or generic name here, because members have already decided by a practically unanimous referendum that Australian bird names must come into line with those of Britain. Purely Australian genera could not be named in the same list under different principles. Australian ornithologists generally are determined to do their "bit" to place Australian ornithology in proper relation to ornithology generally. Mr. Mathews, a member of our Check-list Committee, is on the International Commission, so that Australia is directly represented, and will accept loyally all rulings of that body. It was with pleasure that the Council received recently a ruling of the International Commission, finally accepting over 200 generic names—*i.e.*, exempting them from future operations of the law of priority. Over twenty Australian generic names were so finalized. If Mr. Campbell, whose fine work for Australian ornithology has received world-wide recognition, will, instead of conducting a profitless "propaganda" that places Australian ornithology in a false position before the scientific world, prepare a list of valid Gouldian names, he can rest assured that his *confrères* on the Check-list Committee will do all possible to secure their final adoption by the International Commission of Zoological Nomenclature.

No desire was expressed for the suggested vote concerning Mr. Campbell's proposal, and the largely-attended meeting terminated about 11 p.m. Those present were entertained by Messrs. Campbell and Mattingley at supper during a convenient break in the proceedings.

The August conversazione was also held at the R.A.O.U. rooms, when Mr. W. H. D. Le Souëf gave an address on a trip to North Queensland. His remarks were illustrated with very many interesting lantern slides depicting the bird-life and general scenery met with.

Notes.

Corrections.—In *The Emu*, July, 1918, p. 16, "*Ægialitis ruficapilla* (Red-capped Dottrel)" should read "*Æ. nigrifrons* (Black-fronted Dottrel)"; and on p. 24 "*Entomyzon cyanotis*" should read "*Microphilemon orientalis* (*Philemon citreogularis*)."

It takes many men to build a bridge or other work of construction; similarly, many hands have helped to make *The Emu* a successful publication. One of these hands has been Mr. W. Scott, overseer of the printing room of Messrs. Walker, May and Co. After 48 years' service Mr. Scott, of his own volition, retired recently from the firm. For 17 years, since the inception of *The Emu*, Mr. Scott, by his conscientiousness, never permitted an

issue to go to press until the least or last irregularity had been satisfactorily adjusted. Mr. Scott comes from that "dour race" of folk which is at present such a thorn in the side of "our friends the enemy" in France.

The National Museum.—In view of the frequent requests made by the public to inspect the egg collection in the National Museum, a special collection of Australian species has recently been arranged and placed on view in the Australian Hall. This comprises over two hundred species, representing most of the kinds likely to be met with, or desired for reference, by the beginner. The specimens, which form a series quite distinct from the more extensive general collection, have been selected to illustrate, as far as possible, the common type of each species, and in a few instances, where the eggs of a particular species show very marked variation, two or more sets are shown. The eggs are arranged in four table cases, and, in accordance with the general scheme adopted in the Museum, both the cases and fittings are coloured black throughout and the eggs mounted on black wadding. The labels, giving the scientific and vernacular names, the locality, and the number of eggs forming a clutch, are written in white ink on a black background. The general effect is pleasing to the eye, and has the decided advantage of riveting the attention on the objects, which stand out prominently from their immediate surroundings.—JAS. A. KERSHAW. National Museum, 11/9/18.

Members of R.A.O.U., 1918.

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 HORNADAY, DR. W. T., Director, Zoological Park, New York, U.S.A.
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ANNUAL MEETING.

UNDER the new rules an annual general meeting is necessary. It has been decided to hold the meeting at the R.A.O.U. room on Wednesday, 4th December.

Members desirous of nominating candidates for election as office-bearers and members of the Council are reminded that under rule 31 such nominations, signed by two members and accompanied by the written consent of the person nominated, should reach the hon. secretary not later than 6th November—"28 days" before the date suggested for the annual meeting on 4th December. Under rule 33 a vote of members will be taken later.

THE MATHEWS COLLECTION.

CAPT. White is now engaged in an attempt to raise £6,000, the sum necessary, in addition to £2,000 donated by Mr. H. L. White and £2,000 by Mr. Mathews, to secure this extensive collection for the South Australian Museum. Remembering the national loss incurred by allowing the Gould collection to go to America, it is hoped that the efforts to secure the Mathews collection for Australia will be successful.



LETTER-WINGED KITES (*Elanus scriptus*).

(Upper Fig. Male. Lower Fig. Female.)

The Emu

Official Organ of the Royal Australasian Ornithologists' Union.

"Birds of a feather."

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[PART 3.

The Letter-winged Kite (*Elanus scriptus*, Gould).

BY H. L. WHITE, R.A.O.U., BELLTREES, N.S.W.

FEW readers of *The Emu* have given so much thought to this bird. Ever since reading the paragraph in Gould's "Handbook," 1865, vol. i., p. 55, it has been my endeavour to confirm the late Mr. Samuel White's observations—viz., that he found this species "in great numbers on Cooper's Creek, between lat. 27° and 28°, always in companies of from 10 to 20 or 30 in number. It flies when near the ground with a heavy flapping motion, but occasionally flies very high, when its movements are very graceful. It is rather inquisitive, but not so bold as *Milvus affinis*. It nests in companies, as near each other as possible. The nest is composed of sticks, lined with pellets ejected from their stomachs, which are principally composed of the fur of the rats upon which they chiefly subsist. The eggs, which are four or five in number, have a white ground, blotched and marked with reddish-brown, darkest at the small end; they are one inch and three-quarters long by one inch and three-eighths broad. The markings are easily removed by wetting."

In view of Mr. Sid. W. Jackson's observations, the above is the most accurate description yet given of the breeding habits of *Elanus scriptus*, though a slight inaccuracy occurs in stating that the egg markings are darkest at the small end; in a very large series in my collection not more than 15 per cent. are so marked.

A. J. Campbell ("Nests and Eggs," page 28) does not improve upon Gould. A. J. North ("Nests and Eggs," vol. iii., p. 254) quotes G. A. Kearland as having noted the birds breeding in Central Australia, but gives no record of eggs being taken at the time. This is not to be wondered at. During a journey such as the Horn Expedition, very little time would be available for special prolonged observations. Mr. Kearland, however, confirms Gould's statements to a certain extent. North is incorrect in stating that eggs of *Elanus scriptus* are less heavily marked than those of *E. axillaris*. In a large series of both species before me I find there is practically no difference in coloration. In both species some eggs are lightly marked, odd specimens almost pure white, while others are simply a mass of colour, as if the egg had been dipped into blood.

Mathews, in "Birds of Australia," vol. v., p. 208, adds nothing to our knowledge of the bird; the colour of its eye and feet in his plate does not agree with Jackson's description of an adult. Jackson's observations, however, carry out the suggestion made in the concluding paragraph of Mathews's article—viz., "Most of its history has been detailed under the previous species (*E. axillaris*); but it seems unlikely to have any well-marked peculiarities of its own as regards habits. If such were ascertained, they would become valuable assets in the consideration of the relationship of these two species." Jackson's notes prove that the breeding habits of the two species are unlike in many respects.

My collectors, who have searched a considerable portion of Australia, are always told to keep a look-out for *Elanus scriptus*. With one exception they have not recorded the bird, the exception being S. W. Jackson, who in 1897 found a pair breeding in the Clarence River district and secured a clutch of eggs, the birds having been driven from the interior by drought conditions, probably. Curiously enough, as the sequel shows, to this collector is due the credit of finally dispelling all doubts upon the breeding habits of *Elanus scriptus*; he lived among the birds during six weeks of their nesting season.

Captain S. A. White, when consulted, informed me that he had noted very few of the birds during his trip to Cooper's Creek, but had great faith in his father's records, and felt sure they were correct in the main.

Four years ago I first saw a glimmer of light upon the subject—small, certainly, but promising, when a report came to hand that a squatter, lately in from far Western Queensland, had seen the birds' breeding-place and had taken a number of eggs. What became of the eggs is a mystery, as *very* few collections contained authentic specimens. Following up the clue, I wrote the manager of the station upon which the birds were said to breed, but, although anxious to assist, he was unable to supply much information. Nothing daunted, I wrote again the following year, and was told that the bird described appeared to be there, and was apparently of nocturnal habits (later on Jackson proved this partially correct). During 1917 I again troubled the manager by asking for a rough skin. This was supplied, together with information that the bird was extremely shy and difficult to shoot. The skin was that of an undoubted Letter-winged Kite. A few weeks later I was excited by the news that a set of eggs was on its way to me. In due course the eggs arrived, beautifully blown, but, alas! nothing better than *Milvus affinis*!

Feeling satisfied that *Elanus scriptus* existed in the locality (Diamantina River), I determined to investigate thoroughly, concluding, in my own mind, that the birds nested during June or July. After consulting with my friend, Mr. J. H. Bettington, of "Terragong," Merriwa, we decided to send Mr. Jackson out. The locality being an extremely out-of-the-way one (260 miles from the nearest railway), it was necessary to forward supplies,

&c., to Winton, so as to catch the yearly teams travelling to the station nearest to our objective. Some of the goods, purchased in Sydney, went by sea to Townsville, thence per rail to Winton. Communications beyond Winton being very uncertain, we decided that the party should travel per car, so as to have a vehicle always available. This decision was carried out in spite of warnings that the far end of the road was impassable for a heavily-loaded motor-car. Mr. Bettington provided a new 30 h.p. six-cylinder Buick, in which Jackson and an expert driver left Belltrees on the 8th June, reaching their destination on the 26th, travelling the 1,400-mile journey by easy stages without as much as a tyre puncture. Readers of *The Emu* may decide for themselves whether good luck or good management enabled the party to cover 1,400 miles without the slightest mishap, the greater part of the last 250 miles over tracks hitherto untravelling by a motor: to fix camp at its destination at a clump of timber in which the birds were nesting, and to secure eggs upon the very day of arrival.

Messrs. Bettington and son joined the camp later, having travelled *via* Townsville to Winton, thence per car.

The collecting trip was a success, skins, eggs, and much valuable data being obtained. I shall leave it to Mr. Jackson to supply particulars of his observations and experiences. All the skins obtained will join the "H. L. White Collection" in the National Museum, while the R.A.O.U. oological collection receives typical clutches of eggs.

NOTE.—In searching for a name for the beautiful little Wren discovered by Jackson and party (see *Emu*, *ante*, p. 121) I could think of nothing more appropriate than "*diamantina*," as I am an advocate for naming sub-species after their locality rather than after some relation or friend of my own. I selected *diamantina*. The river bearing that name was discovered by M'Kinlay in 1862, and was called after the wife of Sir George Ferguson Bowen, Governor of Queensland, 1859-1868. Lady Bowen was the Countess Diamantina Roma, daughter of Count Candiano Roma, President of the Ionian Senate, a nobleman of an ancient Venetian family, who possessed large estates on the Island of Zante.

Acanthizas.—In my note on a northern form of *A. nana* mentioned in *The Emu*, *ante*, p. 122, I omitted to state that I received the specimens from our Queensland member, Mr. H. G. Barnard. Now he has been good enough to send me another specimen, this time *A. albiventris* (North)—an extension of locality, as I think this species has hitherto only been recorded for "interior of New South Wales." While on the subject of Acanthizas, I may state that my collector, Mr. F. L. Whitlock, has sent me from Sharks Bay, W.A., specimens of two interesting kinds—*A. morgani* (*iredalei*) and *A. whitlocki*. The former, I think, links up with *A. winiamida*, recently described by Mr. F. E. Wilson, from the Mallee, Victoria (see *Emu*, xvi., p. 169).—H. L. WHITE.

Haunts of the Letter-winged Kite (*Elanus scriptus*, Gould),

WITH AN ACCOUNT OF ITS BREEDING HABITS, AND NOTES ON SOME OTHER SPECIES.

BY SIDNEY WM. JACKSON, R.A.O.U.

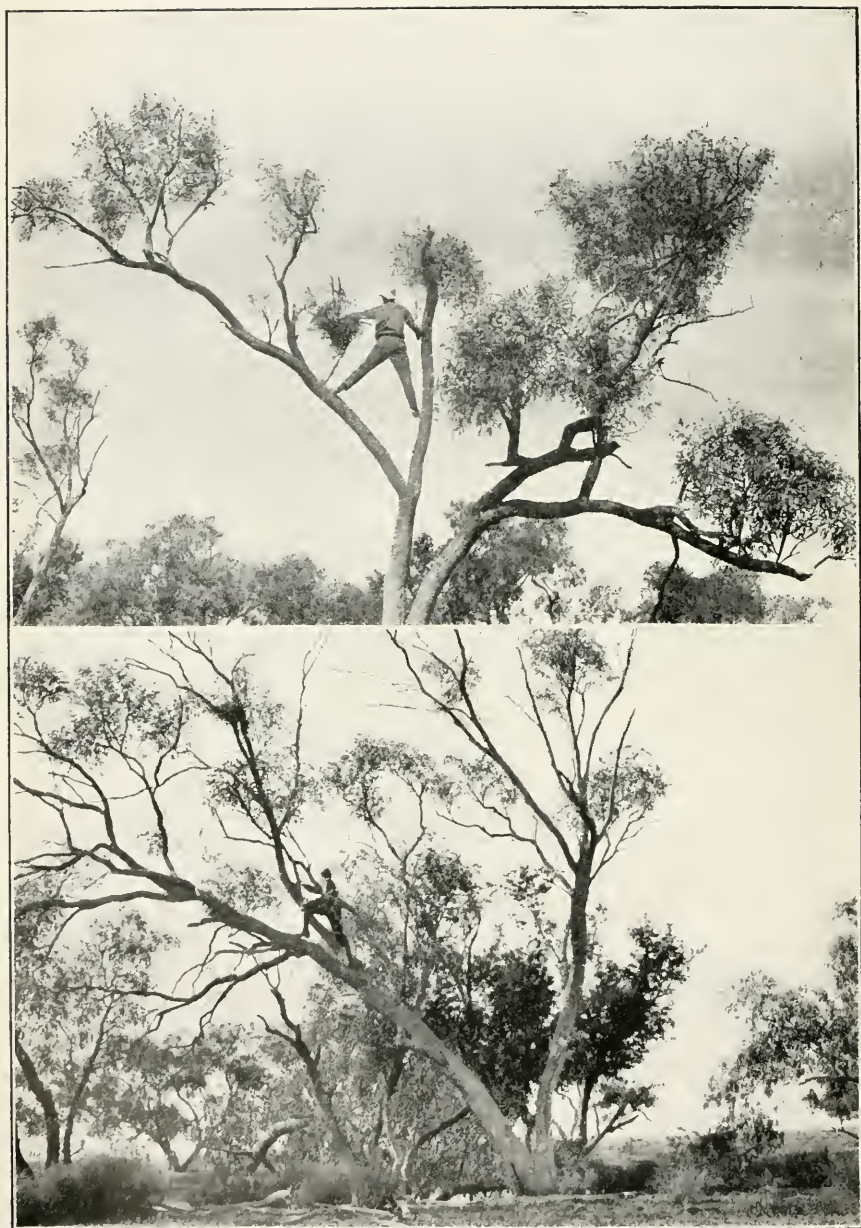
LEAVING Winton, in Western Queensland, by motor-car on the morning of the 23rd June, 1918, we arrived at our camping base on the Diamantina River on the afternoon of the 26th, in that time having travelled, with our load, over 263 miles of very rough country—a severe test for a big car.

We carefully watched the clumps of coolabah and other trees all the way from Winton in the hopes of meeting with Letter-winged Kites, and when nearing our destination were pleased to learn that these birds were reported to be breeding in the locality selected.

The driver (Mr. H. Cottrill) negotiated the car on the long journey from Belltrees, New South Wales, without a mishap of any kind—a good record, considering the heavy load, and covering a distance of nearly 1,400 miles. After passing over another of the many extensive and treeless plains we met with a clump of trees known as coolabah (*Eucalyptus microtheca*, F. v. M.), which were mostly of rather stunted and drooping growth, fringed all round the edge of a long, narrow billabong or water-hole, about a quarter of a mile in length, which appeared to be drying up fast. The continuous and hungry winds sweeping across these vast plains, week after week, soon dry up everything. We noticed all the way from Winton that the closer these trees grew to water the more drooping, long, and decidedly bent did their limbs become, and formed all kinds of grotesque shapes. Leaving the car, and walking over to this clump in order to make an inspection, no birds of any kind were noticed at a distance, except a few Ravens (*Corvus australis*) and Crows (*C. bennetti*), but just as we got close, and almost under the trees, we were pleasantly surprised to see five Letter-winged Kites fly up from their nests in the coolabahs, soon followed by more, and within a few moments we counted 36 of these handsome birds flying overhead. By a series of flights they got higher and higher, flying with their wings placed in a distinctly rigid, narrow V-shaped position, and quivering only the ends, after the manner of a butterfly or moth when fluttering and settling on a flower. This peculiar flight they kept up until they ascended so high that they appeared like minute specks of thistledown in the sky, rendering them most difficult to see at such a great height, notwithstanding the sun was shining on their white under sides. This flight is carried out in a most graceful fashion, and the bird often topples over a little to the left, and then to the right, as it quivers its way upwards. During all this procedure they kept directly over the clump of trees wherein they were nesting. Naturally, this discovery caused us much excitement and pleasure, and set our minds at ease.



Billabong of Diamantina River, Western Queensland.
Site of a Breeding Colony of Letter-winged Kites (*Elanus scriptus*).



Coolabah Trees, with Nests of Letter-winged Kite.
(Bottom picture shows use of mirror on end of rod for examination.)

The first nest I climbed to contained three eggs, and was placed 16 feet up from the ground. Other nests contained four, five, and six eggs each, the situation varying from 11 to 19 feet up. Altogether, in this clump of trees (known to us as colony No. 1) 19 nests were examined, seven of which contained eggs, while others were just ready for them, and four contained very young birds. These nests had many pellets of rat-fur in them, which had been ejected by the birds, and the ground beneath was frequently covered with a great many. The older the nest, the more numerous were these pellets, as well as the loose fur. No sticks from trees were found in the construction of any of the 19 nests examined, but were built of thoroughly dry *twigs* collected from weeds and shrubs which grow on the plains about the billabongs after heavy rains and floods. At the time of our visit these shrubs were still numerous, but, of course, dead, leafless, and quite dry. The nests were lined or padded inside with coolabah leaves, which were more often *completely covered over with a mass of rat-fur*. Twigs were removed from several of the nests for the purpose of identification; these were then carefully linked up with other specimens which were still standing on the ground, but with one exception (*Muehlenbeckia cunninghami*) all dead. After some careful hunting the seed-pods, leaves, &c., of the different twigs were collected, and placed in bundles with each respective species. These have since been kindly identified and named by Mr. J. H. Maiden, I.S.O., Government Botanist of New South Wales.

The twigs chiefly used, and forming the bulk of each nest, are of a pale yellowish colour, exceedingly light, and are from a small shrub known as *Trianthema decandra*, L. Many of these twigs used were well over a foot long. The only other twigs met with in the construction of these nests were *Sesbania ægyptica*, Poir., *Muehlenbeckia cunninghami*, F. v. M., and *Sphæranthus indicus*, L., also a shrub of the order *Ænotheraceæ*, and closely allied to *Epilobium*, which could not be identified with absolute certainty, as no linking-up material could be collected at the time, the plants all being too long dead.

The nests varied in size. The smaller ones had the appearance of being quite new, while the larger ones had apparently been added to year after year. Typical nests measured about 14 inches across over all, with a depth of about 8 inches over all, egg-cavity measuring 8 by 3 inches, more or less; some only measured 11 inches across, while others were as much as 20 inches, but these had been used before, and the lining in such cases was a *solid* thick mass of rat-fur. Eggs and young birds were also found in these larger structures.

Moving on from the nesting-place at No. 1 colony, we motored across the open plain for about three miles, and, after passing over some more very rough dried-up billabongs and natural flood-channels, met with another narrow water-hole running north and south, and nearly a mile long, fringed round the very edge with coolabah trees. Here we decided to camp, as the water

was much better than at the other hole visited, and would last longer. Here another colony of the Letter-winged Kites breeding was discovered, and when preparing camp a nest containing eggs was found in a coolabah tree that stood over the spot. Ropes were used for tent construction, as poles were unprocurable. This we named colony No. 2, and a hunt rewarded us by the discovery of more nests. Some contained eggs, others young birds, and several were just ready for eggs. The birds (which at this colony totalled 20), upon being disturbed, flew up overhead in the same peculiar and most graceful V-shaped flight as they did at No. 1 colony, and kept doing so until they got up so high that it was only with much difficulty they could be observed, and the altitude must have been very great. They kept directly over the clump of trees wherein they were nesting. All the nests at colony No. 2 were constructed of exactly the same kind of twigs, &c., as already quoted from the nests at colony No. 1. All were in coolabahs. One nest was well hidden in a dense clump of a very curious-looking mistletoe, and a set of samples collected by me on the spot have since been identified by Mr. J. H. Maiden as *Loranthus grandibracteus*, F. v. M. This parasitical growth was noticed on a number of the coolabah trees. The eggs numbered from four to six for a sitting, and the most usual clutch met with contained five. They varied greatly in size, shape, and colour; many were boldly blotched, and very handsome, resembling closely the eggs of the Black-shouldered Kite (*Elanus axillaris*). The nests were placed from 12 to 35 feet up from the ground, and often situated near the ends of limbs leaning well out over the water-hole. One nest was in the top of a coolabah which stood in the middle of the water-hole.

Later several more breeding colonies of the Letter-winged Kites were discovered, and the number of eggs most frequently met with was *five*. On three occasions only, and when nests containing heavily-incubated eggs were being examined, the female bird returned and flew savagely at the climber, swooping down at him with her sharp claws open and her legs hanging low. The wind from her wings could plainly be felt on one's face as she dashed past. All the nests were built of the same kind of twigs as already described, and the birds all flew up overhead with their wings upright and V-shaped, as previously noted. But I found that the ordinary flight of these birds, after the young had left their nests, or when not hunted or disturbed by man, was much more horizontal and natural, the quivering and upright V-shaped position of the wings being entirely absent. When nest-building, the birds carry the twigs in their claws, and collect them from the ground or on the dead and dry shrubs beside the trees wherein they are breeding. We never noticed them flying more than a few hundred yards away from the trees, at most, when collecting nest-building material, and always quickly returning with a twig.

The various colonies discovered were generally situated from 3 to 5 miles apart, and always in clumps of coolabah trees growing



Nest, *in situ*, and Eggs of Letter-winged Kite.

PHOTO. BY S. W. JACKSON, R.A.O.U.

PLATE XXIV.



Nest of Letter-winged Kite containing young in down.

PHOTO. BY S. W. JACKSON, R.A.O.U.

on the edges of long, narrow water-holes, which are filled by the Diamantina when it overflows in flood time, as was the case during last February. The seas of water on this great expanse of flat country during a flood must be a wonderful sight. As a rule, about 12 to 18 pairs of the birds constituted a colony when breeding. After examining a very big series of the nests, we found that the smallest were always the newest, and by far the cleanest. Often these structures were well hidden in the green leaves of the trees, and in clumps of mistletoe growing in great masses on the trees; then, again, they are often exposed to view and placed away from all foliage, though well up from the ground. Only one case came under our notice where a nest was built in a tree other than a coolabah: this was found in a clump of mistletoe (*Loranthus exocarpi*, Behr.) in a white-wood tree (*Atalaya hemiglaucæ*, F. v. M.) Many of them, and the limbs and ground beneath, were more or less marked and streaked with whitewash-like droppings—in fact, some were nearly as objectionable as the nests of Cormorants. With a few exceptions, rat-fur pellets were found in every nest, and on the ground under one of ordinary size, which contained a clutch of five eggs, 73 of the pellets were picked up, some measuring 2 inches by 1 inch. This proves the immense value of these birds, and the number of rats that one pair must destroy in a comparatively short period. Only one nest was found in each tree, except on two occasions, when two were met with, and in each case one was very old and not used.

Mr. J. H. Bettington and his son, Mr. B. C. J. Bettington, arrived at the camp on 19th July, and they gave me much valuable help in carrying out the work. They also enjoyed being amongst these beautiful birds, and found and saw many breeding.

Climbing coolabah trees, especially during the strong winds, requires much care, as the green limbs often snap like a carrot. During our visit the district, for a face of a few hundreds of miles, was overrun with a plague of millions of large rats, the Letter-winged Kites living on these, which they captured *at night*. We never saw them hunting for food during the day; they roosted all day in the coolabahs, and went out over the plains rat-catching as soon as it was dusk, and kept going backwards and forwards all hours of the night and early morning. I collected specimens of these rats for identification, preserving them in jars. The larger and more numerous species (as shown in one of the accompanying photographs) is known as the long-haired rat (*Epimys longipilis*, Gould), and the smaller species is the sordid rat (*Epimys sordidus*, Gould). A peculiar species of mouse, of which only one specimen was met with by us, is known as the fat-tailed pouched mouse (*Sminthopsis crassicaudatus*, Gould). This very handsome little animal possesses a large and remarkable carrot-shaped tail, rather like that found on some of the gecko lizards.

The male birds appear to do most of the rat-hunting, and on returning to the clump of trees utter a short and feeble "Chirp-chirp-chirp-chirp" or else a short and feeble "Kack-kack-kack-

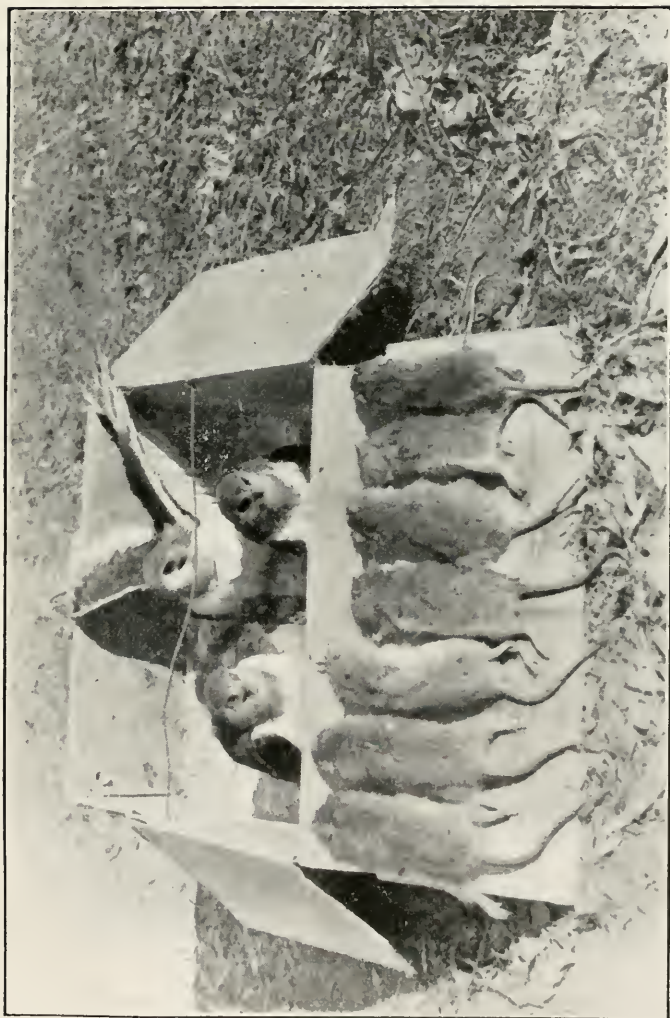
kack," which the female, on or near her nest, answers by rendering a loud and prolonged "Kar-kar-kar-kar," and when he arrives at the nest her noisy cry is repeated, but with much more vigour. We heard these noises going on at night beside our camp at colony No. 2 for several weeks, and at times, when the boisterous winds had considerably abated, the screeching and calling *on the whole length* of the clump of coolabahs could be heard. As a rule, the noise usually started with renewed vigour just as the moon rose, and it did not matter if it was 8 p.m. or 2 a.m. : then the babble of cries and rat-catching proceeded. However, on the other hand, we have frequently heard the males calling on returning from the plains with rats *on dark nights*, and feeding the females at the nests in the usual way. On moonlight nights they appeared to fly a little higher than was the case on dark nights. The birds kept quiet when returning until they got within a few hundred yards of the spot ; then they rendered their advance note of approach as described.

The day note of the male bird, made chiefly when on the wing, is a peculiar loud and sudden call resembling "Kack-kack-kack-kack-kack-kack," being very much louder than the night call, and, strange to say, very closely resembling the notes of the Dollar-Bird or Australian Roller (*Eurystomus australis*), but not quite so loud. The female's day note is often a peculiar chicken-like "Chirp-chirp-chirp-chirp-chirp." Both birds utter this particular note, male mostly at night.

Two species of lice infested these birds in great numbers, and samples were collected for identification.

Just before sunset the birds face the setting sun, and their white breasts look beautiful with the green foliage of the coolabah trees behind and the sunlight upon all. If the birds fly about the trees during the day, they keep close to those wherein they are nesting, and frequently perch on top of a dead upright branch. This position is generally taken up by the male bird. Nothing is known to me of the actions and habits of these birds other than those observed during their breeding season, and these differ from those of the Black-shouldered Kite (*Elanus axillaris*), which species I have had much experience among, both during and after their breeding, in 1897 and 1898 in New South Wales. The Letter-winged Kite looks very beautiful and graceful when flying directly overhead, and the black bar, so well defined, running along the under side of the wings, stands out most distinctly on the white, a black letter V thus being formed on each wing when they bend in flight.

On revisiting (some weeks after) one of the nesting-places of this bird, we were surprised to count 17 of them flying out of a small coolabah tree, wherein they had all been roosting. The young birds, on being handled at the nests, make a great noise, which resembles the loud and shrill squeak of the paper trumpets often blown by the crowds of young people in the streets at Christmas time.



Young Letter-winged Kites at Camp, with daily meals of Rats.

PHOTO. BY S. W. JACKSON, R.A.O.U.



Young Letter-winged Kites at Camp.

Some of the young birds, well feathered but not able to fly, were taken from the nests and kept alive at the camp in a box for a few weeks. We fed them morning and evening with pieces of rat-flesh cut from those which we had killed the night previous. It was remarkable how comparatively tame they soon became, and at feeding time they would sit with their mouths wide open, screeching loudly. It was surprising the way they could gulp down large lumps of food, and often impatiently snap it from your hand. We always removed the skin from the rat before cutting it up to feed them, and later, when a whole unskinned rat was thrown into their box, one of the birds would quickly grasp it with its sharp, strong claws, tear it to pieces with its bill, eating it nearly all without assistance. Three of them are shown in the box in an accompanying photograph. Not only do these birds eject the fur, but the bones have very frequently been also found in the fur pellets which they cast up.

Only on one occasion did we find these birds breeding in a nest belonging to another species, when the eggs were found in a nest of the common Kite (*Milvus affinis*), and in all probability the *Milvus* had taken the nest of the Letter-winged Kite *first*, as the *Milvus* were found frequently using the nests of these other birds. A series of 15 of the birds under notice was secured and made into skins—from nestlings about a week or 10 days old up to the fully adult breeding birds. Of these, 11 were nestlings of various ages, 2 adult males, and 2 adult females.

On examination of the young birds to try and ascertain their sex, I was surprised to find how well developed the sexual organs were in most of them. It is a well-recognized fact that, as a rule, *nestlings* cannot be sexed, and that has also been my experience until I examined the young ones under notice. The young in the down stage, and about a week old, are white on the head and breast and pale fawn on the back. Legs pale flesh colour, bill black, and eyes coffee-colour. The young, *on hatching*, have black eyes. Nestlings about a month old all have a rusty-coloured breast, and a male specimen measures—total length 265 mm., wing 159 mm., tarsus 33 mm., bill 31 mm., tail 60 mm. Cere pale horn; legs and feet pale yellow; bill black; claws black; eyes coffee-brown. (Testes small.) Another specimen (female), about seven weeks old, and able to fly, measures—total length 380 mm., wing 312 mm., tail 162 mm., tarsus 33 mm., bill 33 mm. Cere light horn; legs and feet pale yellow; bill black; claws black; eyes reddish-brown. (Ovaries present.) The rusty colouring on the breast gradually disappears after the birds fly from the nests, and the coffee-coloured eyes start to turn to a reddish-brown.

I noticed that some of the full-grown and flying young measured about half an inch more than the old adult birds *in total length*, and the specimens were all measured most carefully. An average adult (breeding) male measures in mm.:—Total length 340, wing 302, tail 149, tarsus 32, bill 30. Cere horn colour; legs and feet

pale yellow; bill black; claws black. Eyes handsome rich ruby red, and sometimes, *on the very inside edge of the ring*, where it meets the large bluish-black pupil, it becomes a little more orange in colour. *Male is smaller than female, and much lighter on the back.* An average adult (breeding) female measures in mm.:—Total length 368, wing 318, tail 159, tarsus 33, bill 33. Cere horn colour: legs and feet pale yellow; bill black; claws black; eyes handsome rich ruby red, as in the male.

None of the birds had a yellow cere, although that colour is quoted by Gould, North, Mathews, and others. Probably the cere during the breeding season loses the yellow colour and turns to horn colour, but that remains yet to be proved.

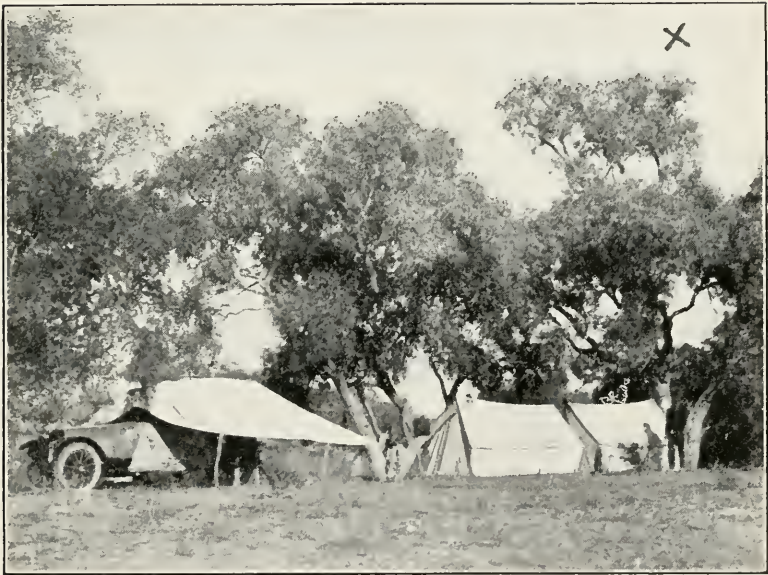
These birds are known to the aborigines of the Diamantina River country as "Gidga-gidga," and the large rats which form the principal food for these birds are also greatly relished by the blacks, and we saw them eating some they had cooked. It is surprising how fat these rats are, considering the district was in a dry state during the time of our visit, notwithstanding that the place was flooded only last February. We killed over 600 of them while we were camped beside the water-hole at No. 2 colony. Everything at our camp had to be suspended by wires from the trees in order to escape these vermin at night. It appears, however, that the movements of these birds are greatly influenced by the rats, as the localities selected for their nidification are more or less frequented by these rodents, and perhaps mice as well. Although many of the birds were found breeding, only a few of their eggs that were considered necessary to take were secured, and the observations made clearly show the value of this handsome species in greatly assisting to keep in check the vermin pest mentioned.

During March of 1862, J. M'Kinlay, when on the Burke Relief Expedition, passed over the ground within a few miles of where we were camped (judging by the examination of his charts), and mentions having seen Sea-Gulls. It is just possible, however, that the birds referred to were Letter-winged Kites, and the mistake could no doubt happen from a distant view of the birds, owing to the ordinary flight of this Kite resembling very much that of a Sea-Gull, combined with the colour of the bird.

NOTES ON OTHER SPECIES.

Milvus affinis. Allied Kite.—This common Kite was met with in great numbers, and as many as 80 were counted on the dead limbs of a coolabah. Their ordinary note is a peculiar Curlew-like whine. When we walked across the plains they often followed close up to us in a big flock, no doubt watching for rats that we might disturb in the cracked ground as we moved on. They capture their food during the day, and we have often seen them flying about carrying a rat in their claws, and on two occasions they dropped one at our camp when fighting in the air and chasing one another. At times they would cut curious antics by flying about with a stick in their claws, which they would suddenly drop, and then swoop down and catch again

PLATE XXVII.



Jackson's Camp on Diamantina River, Coolabah Tree in background containing nest (under cross) of Letter-winged Kite.

PHOTO, BY S. W. JACKSON, R.A.O.U.

before it reached the ground. Several of them would take part in this game, which would often end with a tussle. They breed in company with the Letter-winged Kite, but make a much larger nest, and use quantities of dead sticks of the coolabah and bauhinia tree (*Bauhinia carroni*, F. v. M.), some being quite thick. Many of their nests were found, also eggs, which varied from two to four for a sitting. The young are covered with white down. We found these birds often breeding in the nests of the Letter-winged Kites instead of constructing their own, though the nests were rather small for them compared with their own structures of sticks.

Lophoietinia isura. Square-tailed Kite.—Several of the birds seen, but none found breeding.

Haliastur spheurnus. Whistling - Eagle.—This bird was very common, and many of their nests and eggs were found, some nests being only 11 feet up from the ground.

Uroaetus audax. Wedge-tailed Eagle.—This bird was not common, and a few nests were seen.

Falco melanogenys. Black-cheeked Falcon.—One specimen seen, and was in a tree close to us.

Falco hypoleucus. Grey Falcon.—Several pairs were noted, and two nests containing eggs discovered—one of three and one of four eggs. One day a pair visited an empty nest of a Letter-winged Kite at our camp. The female went on the nest and kept turning round and round in it and uttering a loud "Cluck-cluck-cluck"; then they both soon departed, and carried on in the same way at other empty nests. The female is much larger than the male, and more noisy.

Both sets of eggs of this species found were laid in nests of *Mitrus affinis*, one being old and dilapidated.

Falco subniger. Black Falcon.—Several of these birds were seen and one nest found containing four young birds in snow-white down, and one of the parents was observed feeding them with pieces of rat-flesh. The nest resembled an old Raven's.

Hieracidea berigora. Striped Brown Hawk.—This noisy bird was very common, and their nests and eggs were met with.

Cerchneis cenchroides. Kestrel.—This species was very common but no nests were found, and an old Diamantinaite informed me that he had sometimes known these birds to lay their eggs in the grass, owing to suitable hollows in the coolabah trees being scarce.

When passing through Winton again on my way home, Dr. P. C. Higgins showed me a specimen of the Kestrel that a domestic cat had captured in the hospital grounds there.

Circus assimilis. Spotted Harrier.—This Hawk was frequently met with, but was not found breeding.

Corvus australis. Raven.—Very plentiful, and breeding.

Corvus bennetti. Short-billed Crow.—Very plentiful, and one pair found breeding. They live in company with the Ravens.

Specimens were secured for identification of both these species. Both species were shot, possessing both hazel and white eyes. The white eyes in both species had a faint tinge of blue on the inside edge beside the pupil, then sometimes it would be on the outside edge. Probably the eyes get white as the birds grow older.

A male specimen of *Corvus australis* (testes swollen) secured measures in mm.:—Total length 495, wing 343, tarsus 56, tail 217, bill 66; legs, bill, and claws black; eyes hazel. And a female specimen of *Corvus bennetti* (ovaries large) measures in mm.:—Total length 425, wing 315, tarsus 51, tail 165, bill 49; legs, bill, and claws black; eyes bluish-white.

Ashbyia lovensis. Desert-Chat.—We were pleasantly surprised to meet with this far inland species on the Diamantina, and think it is the first record of it for Queensland. Its actions are much like those of a *Mirafra*, and it flies in short and sudden swoops. Its home is on the ground on the plains, and we saw about 30 of them during our visit. The first one we secured was near our camp on a clay-pan partly covered with two small species of salt-bush—viz., the squash salt-bush (*Atriplex holocarpum*, F. v. M.) and the purple-flower salt-bush (*Frankenia pauciflora*, D.C.), both species thickly covered with fine powdered salt. Where these growths spread out flat on the ground, the birds probably collect small insects from under their edges. Specimens of the birds examined contained the remains of small beetles. We obtained a fine view of them to the north of the camp some miles. When the bird flies it usually keeps its bright yellow breast from view, showing its brownish back instead, which colour closely harmonizes with that of the surrounding country. They were also noticed on the flat gravel or stone-covered areas, as well as on the clay-pans and plains.

Four birds were collected. One of the male specimens secured measures in mm.:—Total length 134, wing 75, tarsus 18, tail 43, bill 17.5; legs dark brown; feet blackish; bill blackish; eyes pale gold or straw-yellow. (Testes small.)

Malurus (Hallornis) cyanotus diamantina. Light Blue-and-White Wren.—Among the various birds collected were a few specimens of this very handsome species, which has since been recognized as a new sub-species, and named after the Diamantina (*vide Emu*, vol. xviii., p. 121). We found the birds frequenting the dried-up water-courses fringed with lignum bushes (*Muehlenbeckia cunninghami*, F. v. M.), and they were very difficult to approach, and when disturbed keep on *flying ahead* over the plains for a long way, and then working round to the lignum bushes again. One specimen which was shot after a long hunt fell into one of the large and countless cracks in the ground, and was lost, though much digging and searching was done.

Several of the handsome males were seen in company with others of brown plumage, which comprised females and young birds. The note rendered is very typical of the *Maluri* genus, and resembles the "twitter" of the common Blue Wren (*M. cyaneus*) very much. Specimens examined contained the remains of small beetles and insects, including small slaters or wood-lice (*Isopoda*, sp.), which live in millions in the deep cracks in the ground, and come to the surface when the weather is dull and cloudy, and like rain, and cover the ground in a moving mass. Sometimes they covered our tents. When touched they roll up like a pea.

A handsome adult male of this species of Wren measures in mm.:—Total length 118, wing 46, tarsus 17, tail 60, bill 13. (Testes swollen.) Legs and feet dark brown; bill black; eyes blackish.

Malurus (Leggeornis) lamberti assimilis. Purple-backed Wren.—This lovely Wren was also found, living in company with the preceding

species, and specimens were secured. A beautiful adult male measures in mm.:—Total length 130, wing 48, tarsus 18, tail 63, bill 13.5. (Testes small.) Legs and feet dark brown; bill black; eyes blackish. Beetle remains found in birds. Note resembles that of *M. lamberti*, fairly common about Sydney.

Rhipidura (motacilloides) tricolor. Black-and-White Fantail.—A few pairs of these happy little birds were always about our camp snapping up the small Barcoo flies. I was informed that the aborigines destroy these birds when they can, on account of a superstition that they are an evil medium responsible for carrying tales and making mischief among the gins.

Eupodotis australis. Bustard or Plain-Turkey.—These birds were very numerous, and were a common sight, as many as 10 to 30 often seen in one lot.

Liemetis nasica. Corella or Long-billed Cockatoo.—Plentiful; great flocks of them sometimes settled on the coolabah trees at the camp. Often a large flock would fly overhead, with a few specimens of *Cacatua roseicapilla* among them.

Cacatua roseicapilla. Rose-breasted Cockatoo.—These birds were frequently seen in flocks of thousands, all feeding on grass roots and seed on the ground. When they rose it was a wonderful sight, and the uproar from their screeching fearful.

Black Cockatoos were frequently seen on the ground feeding, but we did not succeed in procuring a specimen, so I am not sure of the species.

Melopsittacus undulatus. Warbling Grass-Parrakeet.—These lovely little birds were not only met with in flocks, but in real clouds of many thousands—a sight that must be witnessed to be in any way appreciated.

Calopsittacus novæ-hollandiæ. Cockatoo-Parrakeet.—Met with in flocks, but never more than about a few hundreds at a time.

Tæniopygia castanotis. Chestnut-eared Finch.—Very plentiful, and travel about in flocks. Many of their nests were found built into the twigs and sticks on the outside of various Kites' and Eagles' nests.

Myzantha flavigula. Yellow-throated Miner.—Common, and very noisy. One note uttered by this bird resembles a peculiar cat-like sound, "Mew-mew-mew," rendered rather slowly. They were always about the camp.

Pardalotus rubricatus. Red-lored Pardalote.—Common, and usually met with in pairs. Their note is the most remarkable of all the Pardalotes that I have met with. The call consists of six notes (sometimes four), uttered quickly, and closely resembles the ordinary six or eight-note call of *Platycercus eximius* (Rosella).

Ocyphaps lophotes. Crested Pigeon.—Common, and seen in flocks in the lignum bushes about billabongs. Their call is "Woo-woo-woo-woo," rendered slowly. The remarkable tin-like or metallic sound produced by the wings of this species when flying is probably due to the spatulate feathers in the primaries.

Lophophaps leucogaster. White-bellied Plumed-Pigeon.—A number met with, and two specimens secured. An adult female measures in mm.:—Total length 217, wing 112, tarsus 19, tail 73, bill 17. Eyes golden-yellow; bare skin round eyes reddish-vermilion; claws black;

legs and feet black; bill black: (Ovaries small.) Secured on red ground, much the colour of the bird.

In addition to the foregoing birds mentioned, the following may be included, as I secured skins of the same:—*Strix delicatula* (Delicate Owl), *Ephthianura aurifrons* (White-fronted Bush-Chat), *Ptilotis sonora* (Singing Honey-eater), *Ptilotis leilavalensis* (Pallid Honey-eater), *Chalcococcyx basalis* (Narrow-billed Bronze-Cuckoo), *Pachycephala rufiventris* (Rufous-breasted Whistler), *Petroica goodenovii* (Red-capped Robin), *Cinclorhamphus cruralis* (Brown Song-Lark), *Halcyon pyrrhopygius* (Red-backed Kingfisher), *Anthus australis* (Ground-Lark), *Mirafrja horsfieldi* (Bush-Lark).

GENERAL OBSERVATIONS.

Altogether, over eighty species of birds were observed, but space will not permit giving details of all.

Several wild domestic cats were seen, and these animals are now very destructive to bird-life everywhere.

A remarkable-looking green flower was found growing in several places on sandy patches. It very much resembles a bird in the act of flying, and is a good representation. The plant has since been identified from the specimens collected as *Crotalaria cunninghami*, R. Br. Frequently numbers of Black-faced Wood-Swallows (*Artamus melanops*) were seen perched on these bushes.

Five different species of mistletoe (*Loranthus*) were found, the viscid berries of which form the chief food of the Mistletoe-Bird (*Dicaeum hirundinaceum*), and this pretty little creature was frequently seen.

We experienced some very cold nights early in July, and had ice at the camp on three mornings. In a direct line we were about 600 miles inland from the ocean. The mirage on the vast plains was a very wonderful sight, resembling seas of water. Sunrise and sunset were glorious sights. Very often, about half an hour after the sun went down, there was a peculiar streak or narrow ray of white light, which went up into the sky for a considerable distance, and direct from the sun's setting point, and plainly visible until after 9 p.m.

The numerous long, narrow water-holes or water-courses on the Diamantina River must have had many aborigines living about them years ago, as on small sand-hills close to a number we visited I found numerous flint chips, heaps of old and much-decayed fresh-water mussel (*Unio*) shells, also large stones once used for grinding the small seeds of the nardoo (*Marsilea drummondii*, A. Br.) plant, which made a valuable sort of flour for these natives. One of these bottom nardoo stones discovered measured 24 inches long, 15 inches wide, and 2 inches thick, and had two grinding hollows worked into it. The nardoo plant (leaf clover-like shape) grew plentifully about our camp, and I saw Emus both there and in North-Western New South Wales frequently eating the seeds and leaves; the latter they eat in large quantities.

There appeared to be a good supply of food for the various water-birds in the billabongs or narrow water-holes. A few of these stretches of water were several miles long, others only half a mile or so. The smaller ones, I was informed, dry up within 4 to 6 months after a flood, provided dry weather follows. As a means of experiment, in order to ascertain what life really existed in these watercourses, we baited an old bag with rats' intestines and fastened it to a hoop made from a piece of strong green lignum bush. This was weighted and lowered into the water for a few nights, with the result that many of the following were caught:—Crayfish (*Astacopsis bicarinatus*, Gray, known to the Diamantina aborigines as "Toom-ban"), long-armed prawns (*Palæmon ornatus*, Haswell), perch (young) (*Therapon unicolor*, Günther), catfish (young) (*Silurichthys australis*, Castelnau), also large and small fresh-water beetles (*Hydrophilidæ* and *Dytiscidæ*). In the mud large mussels (*Unio*) were found, and the broken remains of these along the water's edge were chiefly the work of the Pacific or White-necked Herons (*Notophoxynx pacifica*).

I was surprised to find the remains of numerous large fresh-water crabs (*Telephusa transversa*, V. M.) round the sides of the billabongs, and from the information gathered from the aborigines and others I understand that these marine-like creatures are only to be seen *alive* at flood-time or immediately after the bulk of the waters recede. Some dead ones collected measured nearly 3 inches across the back. They are known to the aborigines as "Gour-war-ah." These crabs no doubt serve as a great food for the aquatic birds, especially those of the Heron family, so very plentiful on the Diamantina. Their burrows were numerous in the banks of the water-holes, and the crabs had buried themselves deeply into the ground, where they apparently remain during a dry period, coming to the surface again during heavy rains. They are armed with a pair of powerful claws, which are very large in proportion to the size of the body.

We were fortunate in having fine weather during our visit, only having a few wet days. To be caught in that flat and extensive boggy country during heavy rains (which was always our fear) would have been a calamity, and one the vital consequences of which can only be thoroughly realized by those persons who have been there. From the evidence of old nests, numerous water-birds breed in the locality during one of these inundations. The site of our camp was under water during last February, just four months before our arrival.

NOTE.—Since writing the preceding article, wherein I mention about the millions of rats, and that the Letter-winged Kites destroy great numbers of them, Dr. J. Burton Cleland, of Sydney, has kindly forwarded me a copy of his lengthy presidential address read before the Royal Society of New South Wales (dated 1st May, 1918), in which he deals extensively with rats, and confirms my

remarks by including this Kite as one of the useful species in destroying these vermin. He also confirms what I state about the vast numbers of rats in Western Queensland, and records an instance when an indigenous species covered the North-Western Plain country of Queensland in 1869 and 1870 (a few hundred miles due north of where I camped on the Diamantina in 1918) in vast numbers impossible to estimate, and states:—"It would be impossible to estimate numbers; for hundreds of miles along the Flinders River and its tributaries traces of these rats were to be seen. *Fifty thousand square miles* of country occupied by these vermin, and one rat to every ten square yards in each mile, would not represent anything like their numbers. The large plains seemed to be their favourite resort. When camping out, every article had to be hung in a tree, and the hobbles, made of greenhide, have been known to be gnawed off the horses' feet during the night." Dr. Cleland also mentions (on page 126 in his address) that in the year 1887 there was an enormous migration of rats—thousands of millions—near Lake Eyre, in South Australia, the information being communicated to the Doctor by Mr. John M. Bagot, who was witness to it all.—S. W. J.

[In view of the importance of Letter-winged Kites as vermin-destroyers, with the kind permission of Mr. J. A. Kershaw, F.E.S., Mr. J. E. Chubb, R.A.O.U. (of the National Museum), has, with his usual skill, mounted and posed a pair of these useful birds (see coloured plate). The plate will enhance the value of Mr. White's and Mr. Jackson's articles, and at the same time be much appreciated by members of the R.A.O.U. Mr. White has been good enough to defray the expenses of the coloured block, as well as of the excellent half-tone blocks accompanying Mr. Jackson's article.—EDS.]

Notes on Birds from the Gouldian-Gilbert Type-locality, North Australia.

(BASED ON MATERIAL IN THE "H. L. WHITE COLLECTION,"
NATIONAL MUSEUM, MELBOURNE.)

BY A. J. CAMPBELL, C.M.B.O.U.

INTRODUCTORY.

It is a matter of history how many of Gould's types of Australian birds, including those collected by Gilbert at Port Essington, Arnhem Land, went to Washington. What was Australia's loss was America's gain, and we do not altogether regret what friends obtain.

Mr. H. L. White conceived the far-reaching idea of sending Mr. William McLennan to explore the northern coast, with instructions to establish a collecting camp at some suitable place on Arnhem

Land. After touching at the Goyder, Glyde, and Liverpool Rivers, M'Lennan remained for a while and camped inland on the King River (see map facing p. 118, *Emu*, vol. xvi.), which locality is, as the Crow flies, about 80 miles from Port Essington, where Gilbert procured Gould's northern types. The King River is, therefore, practically the Gilbertian type-locality. Judging by the reports of explorers and others, the same class of country is common to Arnhem Land, Kimberley on the west, and Carpentaria on the east. Our exploring member, Mr. Gerald F. Hill, who, besides being a good field ornithologist, has made a study of botany, and understands the flora and physical features of a country, has informed me that he can find little or no difference in the character of country, say, around Napier Broome Bay (North-West Australia) and that of Port Darwin district and the Macarthur River (Northern Territory). In fact, Mr. Hill says the embouchures of the Fitzroy River, in the North-West, and the Macarthur River, in the Gulf country, bear a striking resemblance to each other. The country generally on the coast has its interminable mazes of mangroves, succeeded in turn by "paper-bark" (*Melaleuca*) swamps, forest flats—eucalypts, *Eugenia*, *Pandanus*, &c.—then gullies running up into rough and broken sandstone plateaus. When Mr. Hill read Mr. M'Lennan's account of the King River country, he could have believed Mr. M'Lennan was describing parts of Kimberley district; therefore, if the environment of the avifauna of the whole country, though extensive, be similar, we should be careful how we subdivide species which, in point of fact, may be identical.

However, for some reason or other which is not apparent, there are slight differences in a few kinds. For instance, some species of birds from Napier Broome Bay (North-West) and the Macarthur River, or Gulf country, are identical, while the same species on the intermediate northern part of Arnhem Land, only three or four degrees (about the width of the little State of Victoria in its broadest part) further north, are a slight shade darker, notably the White-tailed Robin (*Pacilodryas pulverulentus*), Brown Shrike-Thrush (*Colluricincla brunnea*), Chestnut-breasted Finch (*Munia castaneothorax*), Masked Grass-Finch (*Poephila personata*), &c. "One Swallow does not make a summer." These few exceptions do not constitute a separate avifaunal sub-locality, with sub-specific differences in species, but can be simply mentioned, if necessary, as "observations." No scientific ends are gained by applying to these trifling, perhaps variable, differences useless classical triple names.

Although a bad season, and enduring many hardships, M'Lennan succeeded in collecting between 50 and 60 Gouldian-Gilbert species, practically all the Port Essington ones save, perhaps, the Little Kingfisher (*Alcyon pusilla*), the Great-billed Heron (*Ardea sumatrana*), the Rose-crowned Fruit-Pigeon (*Ptilonopus ewingi*)—both the latter seen but not collected—and a few of the Limicoline birds. The Rose-crowned Fruit-Pigeon is also found in North-West Australia (see Hill, *Emu*, x., p. 263).

Now that geographical races are so keenly discussed and described, it is important to have a given starting-point, or key-note, as it were, for North Australian birds. Therefore, specimens from an original centre like the Port Essington region are indispensable for examination and comparison. Although 80 years have elapsed since Gilbert's day, there has been probably no variation, save seasonal, &c., in the respective species in the north. At least, Gould's fine plates, that have been compared with M'Lennan's skins, do not indicate any change, so far as coloration is concerned.

John Gilbert worked from "Victoria," as the military settlement at Port Essington was called. The settlement was formed in 1838 and abandoned in 1849.* Gilbert appears to have reached the settlement during 1841.

Gilbert accompanied Gould to Australia as a taxidermist, and was sent to Western Australia in 1839. When Gould returned to England, 1840, Gilbert followed with his (Gilbert's) western trophies, and in 1841 (or 1842) returned to Australia, touching at the West again on his way to Port Essington, Northern Territory. There is no available record how long Gilbert remained at Port Essington. Gould seems to have described Gilbert's discoveries there mostly in the "Proceedings of the Zoological Society" (London), 1842, notably at the October meeting, when he "exhibited and characterized" thirty new species of birds. In 1844 Gilbert joined Leichhardt's exploration expedition from Brisbane to Port Essington, and, unfortunately, met his death at the hands of treacherous natives, 29th June the next year.† A photo. reproduction of the marble tablet erected to the memory of Gilbert in St. James's Church, Sydney, is in *The Emu*, vol. xi., plate xv.

The following personal sketch by the late Mrs. Robt. Brockman, of Guildford (W.A.), which shows Gilbert's enthusiasm as a collector, was communicated to the writer, and is not without interest:—

"He was in the York district collecting birds, also their eggs, for Mr. Gould's large work, 'The Birds of Australia,' and in the course of his travels one day came to 'Woodside,' and, as a matter of course, was asked to stay and rest. We liked him so well that we told him to consider our house his headquarters whenever his occupation brought him within reach of us; and he was a great deal with us while after the birds he was in quest of.

"He used to go out after breakfast, provided with some luncheon, and we seldom saw him until late in the afternoon, when he would come in with several birds and set busily to work to skin and fill them out before dark. In the evenings he used to sing for us, and it was a great treat to hear his lovely voice, for

* A paragraph concerning the settlement will be found in Professor Ernest Scott's "Short History of Australia," p. 245. Further reference may be found in the British "Parliamentary Papers" for 1843, vol. xxxiii.

† An account of the circumstances of Gilbert's tragic end is recorded in "Nests and Eggs" (Campbell), vol. i., pp. 330, 331.

such a beautiful tenor voice was rarely heard in those days. He had a good selection of songs.

"He was an enthusiast at his business, never spared himself, and often came in quite tired out from a long day's tramp after some particular bird, but as pleased as a child if he succeeded in shooting it.

"We became very friendly, and were much grieved to hear of his sad death. Strange to say, he always had a dread of blacks, even in our quiet place. He told me he was a widower, and spoke in very loving terms of a little daughter he had left in England.

"I wish I could recollect more about him. I shall only add once more that we all liked him much, and thought highly of him. I remember his face now, perfectly, as he used to look when he came in and threw off his heavy pack. He would say, 'Now for a cup of your nice tea, and I shall be all right.' I think he was, altogether, nearly two months in our neighbourhood, then he travelled on towards Toodyay."

It would be nothing short of a national calamity were Australians to allow Gouldian-Gilbert names that are scientifically correct to be displaced on their bird-lists by some obscure, or obsolete, or long-forgotten name, which certain nomenclators desire to have.

An interesting and graphic account of M'Lennan's adventurous and trying trip is recorded by Mr. H. L. White under the title of "North Australian Birds" in *The Emu*, vol. xvi., commencing at page 117. A second article, by M'Lennan, commencing at page 205, contains copious field notes, data, &c., which are extremely useful for reference.

Gilbert did not leave many ornithological "stones" unturned, because M'Lennan discovered but one new species—the White-stripe Honey-eater (*Ptilotis albilineata*, White)—plate xlv. Nor did M'Lennan miss much that Gilbert saw, save the few species before stated. In the month of January (1916) M'Lennan flushed some of the Swinhoe Snipe (*Gallinago megala*), and shot a specimen. Gilbert also collected the species, which Gould, strange to say, though somewhat sceptically, mistook for the common Australian Snipe. Had Gould's scepticism carried him farther, he might have anticipated Capt. Swinhoe's discovery by twenty years! Gould writes ("Handbook," ii., p. 271):—"On comparing the Snipes killed at Port Essington with others obtained in Tasmania, some trivial differences are found to exist, and which it is necessary to point out, in order that future observers may be induced to ascertain if they be identical or if they constitute two distinct species; on a minute examination, the Port Essington bird is found to have a shorter tail, and the four lateral feathers narrower, than in that of Tasmania, besides which the tail of the former is composed of eighteen feathers in both sexes, while the specimens of the latter contained in my collection numbered sixteen. It is true they were killed during a partial moult, which circumstance renders it doubtful whether sixteen be the right number or not."

Gilbert mentions that the Port Essington bird was only an occasional visitor, arriving about the middle of November, when the rainy season commenced, and disappearing again in a week or two. During its short stay it frequented swampy but open grassy situations. He never saw more than six or eight at a time, and always found them very wild.

Long years afterwards it was left to the untiring energy of Mr. Gregory Mathews to establish the existence of a second species of Snipe in Australia, first mentioning it in *The Austral Avian Record*, i., p. 125 (1912), then figuring the bird in his greater work, "The Birds of Australia," iii., pl. 167. While praising Mr. Mathews's good work, it is only fair to students to say his "1913 List" is very puzzling on some points. I found it convenient to take the Gouldian-Gilbert type-localities from it, but in checking Gould's original references I found that eight or ten type-localities were not Gilbertian, but were "North-West Coast of Australia" and not "Port Essington, Northern Territory," as indicated on Mr. Mathews's "List." The instances are cited as they occur in the pages following.

LIST OF SPECIES AND REMARKS.

[*Nomenclature according to R.A.O.U. "Check-list," together with that of Mathews's "List of the Birds of Australia" (1913).*]

Megapodius tumulus, Gould. Scrub-Fowl.

Megapodius duperryi tumulus.*

One ♂. Heavier than the Eastern Queensland variety (*assimilis*, Masters), especially bill and legs, besides being darker in colour and having the loose feathers of the head not so reddish-brown. Wing, 280 mm.; eastern bird, 250 mm.

Gilbert furnishes a long and interesting account of the Scrub-Fowl's habits as witnessed at Port Essington district (Gould's "Handbook," ii., pp. 168-174).

Synoicus (australis) cervinus, Gould. Northern Brown Quail.

Ypsilophorus ypsilophorus cervinus.

One ♂, 1 ♀. Smaller and redder (sandy), especially the ♂, than typical *australis* from New South Wales, but similar to North-West Australian birds (see Mathews's "Birds of Australia," i., pl. 11). Gould does not figure this race. A specimen procured by H. G. Barnard and myself on Kirrama table-land, Rockingham Bay district, is not "more reddish on the under surface," on which supposition Mathews has designated it *queenslandicus*.

Turnix castanota, Gould. Chestnut-backed Quail.

Austrotornix c. castanota.

One ♂, 2 ♀♀. Lighter red than North-West Australian specimens, which differ, as Mathews has pointed out (*Nov. Zool.*, xviii., p. 181), and named *magnifica*. Moreover, King River birds possess

* Mathews has since amended the genus and the dominant species—*vide Austral Avian Record*, vol. ii., p. 112, and vol. iii., p. 20, respectively.

darker markings on the back, while in the North-West examples the white markings on the head are of a more spotted nature.

As the North-West coast is Gould's type-locality for *castanota* (see *P.Z.S.*, 1839, p. 145), how does Mathews propose dealing with his sub-species *magnifica* from the same faunal region?

Wing measurements in mm. :—♂, 87; ♀♀, 87 and 90; North-West ♀, 102.

Geopelia placida, Gould. Ground-Dove.

One ♀. Smaller than southern birds—*tranquilla*, from New South Wales. Western examples (Coongan River) are browner, as depicted by Mathews ("Birds of Australia," i., pl. 32, back figure), and subsequently named *clelandi*.

Chalcophaps (chrysochlora) longirostris, Gould. Long-billed Green-Pigeon.

Two ♂♂. Under surface of southern birds—typical *chrysochlora*—is browner, while the northern race is more chocolate or purple-brown, besides the difference in length of bills. Again, viewing the green backs at right angles, *longirostris* has the more bronzed appearance. The northern bird has not been figured.

Geophaps smithii, Jardine and Selby. Naked-eyed Partridge-Pigeon.

Terrapheaps smithii.

Two ♀♀. Although not a Gilbertian discovery, Gilbert furnished Gould with specimens and interesting field notes concerning this bird, and it may be mentioned that the Territory birds (type-locality) have the naked space round the eye *scarlet*, as against *yellow* in the North-Western race, which Mathews differentiates under the name of *blauwi*. The former has the shorter wing by nearly half an inch.

Eulabeornis castaneoventris, Gould. Chestnut-bellied Rail.

Two ♂♂, 1 ♀. Fine and typical specimens. Gould at first received eggs of this species, but, on account of its shy nature and mangrove retreat, it was some time before he obtained material to identify and describe the parents.

Lobivanellus personatus, Gould. Masked Plover.

Lobibyx miles personatus.

One ♀. Wing, 222 mm. Common at Port Essington in Gilbert's time.

Hæmatopus ophthalmicus, Castelnau and Ramsay. Bare-eyed Oyster-catcher.

Hæmatopus niger ophthalmicus.

One ♀. This northern bird is apparently a good sub-species, and possesses a longer bill, by an inch, than *H. fuliginosus (niger)*.

Notophox (aruensis) flavirostris, Sharpe. Pied Egret.

Tonophox aruensis flavirostris.

Two ♂♂, 3 ♀♀, 2 ♂♂ juvenile, 1 ♀ juvenile. Although observed by M'Lennan at the Glyde River, northern coast of Arnhem, he collected these skins at the Roper "rookery," Gulf of Carpentaria.

The mature birds were in perfect plumage—blackish-slate and white. The young are variously marked on the head—one is dark, another whitish, and another brownish. According to M'Lennan,* some full-fledged young are pure white on the head, as shown in Sharpe's plate of *N. aruensis* ("Cat. Birds Brit. Mus.," xxvi., 1B), which is apparently an immature bird of the above species. Mathews recognizes another "Gulf" sub-species—*normani*, "smaller and darker" (*A. A. R.*, ii., p. 126). Does he infer that every rookery has a different sub-species? Birds from South Alligator River are similar to the Roper ones, as is also an immature specimen collected on the Archer, on the opposite shore of the Gulf, similar to the Roper immatures. If one is partly making sub-species on colour variation, one needs to be very accurate, and, without being hypercritical, it may be pointed out that while Mathews's plate ("Birds of Australia," iii., No. 190) shows the true colour—*blackish-slate*—his text states *slaty-black*: two different colours, or hues, according to chromatology.

Gould's splendid coloured plate (No. 62, "Birds of Australia," vi.) depicts a pair of these little Pied Egrets beautifully posed.

Garzetta immaculata, Gould. Lesser Egret.

Egretta garzetta immaculata.

Two ♂♂. Average dimensions in mm. :—Length 606, wing 268, culmen 88, tarsus 106. Legs black; bill black, with yellow base. From the Roper rookery, and apparently typical.

Mathews, because of its "smaller size," differentiates the North Queensland bird as *kempi*. Many of Mr. Mathews's distinctions are exceedingly subtle, and sorely puzzle students. Do some of his sub-specific names merely indicate certain localities? If so, it might be more instructive, for instance, to state them thus:—"*G. immaculata* (North-West), *G. immaculata* (Territory), *G. immaculata* (North Queensland)," as the case may be. Lesser Egrets from all these localities are apparently alike.

Butorides stagnatilis, Gould. Little Mangrove-Bittern.

Butorides striata stagnatilis.

One ♂, 1 not sexed, 1 immature. Mathews has adopted the dominant specific name, *striata*, of the South American bird, because of its general resemblance in structure and coloration to the Australian one. This may be understood; but we cannot follow him in a further subdivision of this Australian form. There is apparently no difference in type-locality specimens and a skin from Cape York which Mathews calls *littleri*.

Tadorna rufigerum, Hartert. White-headed Shieldrake.

Radjah radjah rufigerum.

Two ♂♂. As Gould gives, in his "Handbook" (ii., p. 360), the white residents' and the aborigines' names of Port Essington, for this fine species, he no doubt took his figure ("Birds of Australia," vii., pl. 8) from examples collected by Gilbert, and adopted the

* *Vide Emu*, xvi., p. 156.

specific name *radjah*. Hartert long afterwards pointed out (*Nov. Zool.*, xii., p. 205) that the Australian bird was sub-specifically distinct.

Ninox rufa, Gould. Rufous Owl.

Rhabdoglaux rufa.

One ♀, 2 ♂ juvenile. As expected, this Rufous Owl is lighter-coloured and slightly larger than the same species frequenting the heavily-timbered tracts of North Queensland. Mathews separates the latter under the name *queenslandica*, and gives good figures of both varieties in his "Birds of Australia," iii., pls. 265, 266. One of the juvenile specimens from the Territory is very light-coloured, with long white down hanging from the back of the neck and from the tibia. Gilbert obtained but one specimen, which became the type.

Calyptorhynchus macrorhynchus, Gould. Great-billed Cockatoo.

Calyptorhynchus banksii macrorhynchus.

One ♂. Wing, 460 mm. All Gould's examples were collected at Port Essington. Whether this fine species be a sub-species or not of *banksii*, it is similar in appearance to North-Western birds (Napier Broome Bay district). Mathews gives the average wing measurements of North-West and Territory birds as 430 mm., and figures a pair (vol. vi., pl. 282).

A ♂ specimen from North Queensland (? *northi*, Mathews) has a wing 440 mm.

Ptilistes (erythropterus) coccineopterus, Gould. Crimson-winged Parrot.

Aprosmictus e. coccineopterus.

Three ♂♂ (one not in full plumage and one immature). As Gould pointed out, this northern race is smaller, but has a larger bill, and the red patch on the wings wears a crimson hue (scarlet-red), and is not so extensive as in *erythropterus*. The northern bird has not been figured.

Podargus phalænoides, Gould. Freckled Frogmouth.

Podargus strigoides phalænoides.

Two ♂♂, 1 ♀. Average wing, 220 mm. The ♀ is inclined to be redder than the ♂♂, and is also redder on the throat, which appears to be characteristic of the ♀. Mathews's *mungi*, for the North-West, is not a convincing sub-species; moreover, Gould's type-bird came from "North-West Coast of Australia" (*vide P.Z.S.*, 1839, p. 142).

There is in the National Collection, Melbourne, a ♀ almost entirely rufous, taken at Alligator River (N.T.), 11/1/13.

Ægotheles novæ-hollandiæ, Latham. Owlet Nightjar.

Ægotheles cristata leucogaster.

One ♀. Similar to other Northern and North-Western skins in the "H. L. White Collection," and is not so dark on the under surface (abdomen) as southern birds from New South Wales or

Victoria. Should Gould's *leucogaster* be reinstated (as a sub-species), the Territory being its type-locality?

I have examined three rufous examples of the Owlet Nightjar from North-West Australia (Hall's *rufa*), the types of which (♂ and ♀) are in the National Museum.

Alcyone (azurea) pulchra, Gould. Purple Kingfisher.

Two ♂♂. Apparently no difference between type-locality birds and those from North-West (Napier Broome Bay), which latter Mathews distinguishes as *alisteri*. However, it is possible to separate the Tasmanian race (*diemenensis*, Gould) from the true mainland *azurea*, by the former's darker—almost black—crown and blue-black, instead of blue, on the sides of the chest.

Dacelo cervina, Gould. Fawn-breasted Kingfisher.

Dacelo leachii cervina.

Two ♂♂. Wing, 190 mm. Darker above, but same size as North-West specimens (*occidentalis*, Gould). The mid-Western Australian birds (Broome and Shaw River) are also lighter-coloured and have a larger wing—210 mm. Mathews suggests the name *cliftoni* for this race. It would be interesting to learn if Mathews's *kempi* for North Queensland is fawn-breasted, or is light-breasted, like the typical *leachii*. The fawn-breasted is found at Cape York, while the typical *leachii* is known to extend to Rockingham Bay district.

Cacomantis (variolosus) dumetorum, Gould. Northern Square-tailed Cuckoo.

Cacomantis pyrrhophanus dumetorum.

One ♂. Smaller and lighter-coloured than specimens taken in New South Wales or Victoria. Wing, 130 mm.

Chalcococcyx minutillus, Gould. Little Bronze-Cuckoo.

Neochalcites m. minutillus.

Three ♂♂, 1 ♀. Nice series. Gould had only one Gilbertian specimen of this bird from Port Essington. Males have the upper surface light bronzy-green, with crown of head the more greenish. The females have a trace of brown upon the breast, while immature birds are apparently not barred, but have a uniform greyish under surface. The *russata*, Gould, would appear to be a more north-east Queensland bird, is more uniformly coloured, with a decidedly darker bronze-green on the upper surface, and with a greater amount of brown on the breast and tail (see also note on Cardwell specimens, *The Emu*, xvii., p. 18).

Since his "1913 List" Mathews has recast, in his opinion, the sub-species of *minutillus*, which includes *russata* (see *Emu*, xvi., p. 34). It would appear that his first arrangement of making each a separate species was nearer correctness. Mr. H. L. White informs me that the eggs in his collection of *minutillus* are "uniform olive-brown, similar to *C. plagosus* type," while those of *russata* "are not to be distinguished from those of *C.*

basalis—i.e., white ground, spotted all over with reddish-brown.”
“By their fruits ye shall know them” is an eternal truism.

The whole family of the beautiful little Bronze-Cuckoos is an interestingly complex problem. The difficulty is to get the eggs of all species properly identified.

Centropus (phasianus) macrourus, Gould. Northern Coucal.

Polophilus phasianinus macrourus.

One ♂. In brownish (immature) plumage. Length 616, wing 240, culmen 36, tarsus 55 mm. Compared with those from North-West (*melanurus*, Gould) there is no difference in this specimen.

Pitta iris, Gould. Rainbow Pitta.

Pulchripitta i. iris.

One ♂. This species was one of Gilbert's original beauties. This male, compared with one from Parry Harbour, North-West Australia, has more of an olive wash in the golden-green coloration of the upper surface, and is larger, notably in bill and legs. Wing, 110 mm. as against 100 mm. for North-West bird. Mr. G. F. Hill, who has observed this species both in the North-West and in the Territory, states it nests in the open forest in the first locality and in the scrub along water-courses in the other.

Microeca flavigaster, Gould. Yellow-breasted Flycatcher.

Kempia flavigaster.

One ♂. This specimen is not so bright as Borroloola (Macarthur River) birds, which, however, do not differ essentially from those of North Queensland (*terrae-reginae*, Mathews). It would be akin to “straining at the gnat and swallowing the camel” to separate these on sub-specific lines; all have whitish throats when in full plumage. Gould's fine plate (No. 94, “Birds of Australia,” vol. ii.) represents a typical bird.

Smicrornis flavescens, Gould. Yellow-tinted Tree-Tit.

Smicrornis brevirostris flavescens.

Two ♂♂, 1 ♀. “The least of the Australian birds,” as Gould states, and identical with Macarthur River (N.T.) specimens, and the same as those from Napier Broome Bay (North-West Australia), which latter Mathews has separated as *rogersi*. Those obtained on the Kirrama table-land, Cardwell (*Emu*, xvii., p. 20) are similar to Territory type-specimens, but, if anything, are a trifle smaller. Gould's plate (No. 104, “Birds of Australia,” vol. ii.) is a perfect representation of the species.

Murchison and Coongan River (North-West Australia proper) examples are similar to each other, and appear to come between *flavescens* and *brevirostris*. As shown in the R.A.O.U. “Check-list,” possibly *flavescens* and *brevirostris* are separate species.

Gerygone magnirostris, Gould. Large-billed Fly-eater.

Ethelornis m. magnirostris.

Two ♂♂, 1 ♀. Gilbert shot his historic pair on Greenhill Island,

near Port Essington. There is no difference in these type-locality birds and Mathews's *cairnsensis* of North Queensland. The latter are certainly not "much paler grey coloration above and paler below." However, that description is applicable to his North-Western race—*whitlocki* (*A. A. R.*, iii., p. 24).

Gerygone lævigaster, Gould. Buff-breasted Fly-eater.

Wilsonavis l. lævigaster.

One ♂, 3 ♀♀. Although the foregoing species is also "buff-breasted"—indeed, more so than this—*lævigaster* from the Roper River can be easily separated by its white brow and white under the eye. It is identical with North-West Australian (Napier Broome Bay) examples—*broomei* (Mathews).

It may be here suggested that if North's *pallida* be not a separate species, it may be a sub-species of *lævigaster*, instead of *fusca* (see also remarks, *Emu*, xvii., p. 20).

Gerygone chloronota, Gould. Green-backed Fly-eater.

Wilsonavis c. chloronota.

One ♂. This Gilbertian species is difficult to observe in the mangrove trees, which it loves. This example does not appear to differ from a ♂ from North-West Australia, which Mathews has differentiated as *darwinii*. Wings of both examples, 54 mm.

Pachycephala falcata, Gould. Northern Whistler.

Lewinornis rufiventris falcatus.

Two ♂♂, 1 ♀ immature. Average dimensions in mm. :—Length 159, wing 86, culmen 15, tarsus 20. Smaller and paler (pale cinnamon) on the breast than the southern race. But colour may be regulated by season—drought, &c.—because a pair (♂ and ♀) taken on the Macarthur River (N.T.) two years previously to the King River specimens is singularly rich-coloured—more so than any southern *rufiventris* in the "H. L. White Collection."

Pachycephala simplex, Gould. Brown Whistler.

Muscitrea s. simplex.

Two ♂♂, 1 ♀. This plain species has a uniform olive-brown upper surface, slightly mottled (striated) throat, light buffy chest, and whitish abdomen. Gilbert states it is shy and retiring. Length 147–148, wing 75, culmen 15–16, tarsus 20 mm.

Rhipidura dryas, Gould. Wood-Fantail.

Howeavis rufifrons dryas.

One ♂. A fine skin. Less rufous on the back, which colour just touches the base of and does not extend along the tail, as in the southern *rufifrons*. It is similar to North-Western birds—*parryi* (Mathews).

There is little difference between skins collected in North Queensland (Cardwell) and Victoria. Probably the true *rufifrons* migrates between these two climes, yet Mathews calls the Victorian migrant *inexpectata*.

Rhipidura isura, Gould. Northern Fantail.

Setosura setosa isura.

One ♂, 2 ♀♀. Slightly lighter-coloured than North-Western and Macarthur River (N.T.) skins. Wing, 83 mm. Since the article by H. G. Barnard and myself on the "Birds of Rockingham Bay" (*Emu*, xvii., p. 23), an examination of a larger series indicates that the birds in that district are a darker race; wing also larger—90 mm.

It should be stated that Gould's type locality for *R. isura* is "North-West Coast" (*P. Z. S.*, 1840, p. 174), not "Port Essington," as shown on Mathews's "List," p. 186.

Rhipidura (motacilloides) picata, Gould. Lesser Black-and-White Fantail.

Leucocirca tricolor picata.

One ♂. Wing, 90 mm. Smaller and not so black above as the familiar southern form.

Myiagra concinna, Gould. Blue Flycatcher.

Myiagra rubecula concinna.

One ♂, wing 73 mm.; 1 ♀, wing 70 mm. Mathews shows Port Essington as the type-locality of this species. Gould, in his works, states that *concinna* "is a native of the North-Western portion of Australia." See also original description, *P. Z. S.*, 1847, p. 221. King River (N.T.) specimens are not so brilliantly plumaged as North-Western birds, and are smaller than the southern race—*plumbea* (*rubecula*).

Piezorhynchus nitidus, Gould. Shining Flycatcher.

Piezorhynchus alecto nitidus.

Two ♂♂, 1 ♀. These examples were collected on the Liverpool and Glyde Rivers, and may be clubbed with *tormenti* (Mathews), from North-West Australia, which is Gould's type-locality. (See *P. Z. S.*, 1840, p. 171.) Wing of both, 90 mm., and females have chestnut-brown backs, whereas in *alecto*, from Cape York, and *wardelli*, from Cardwell, the backs of the respective females are lighter (cinnamon-rufous). In *alecto* the male has a bluish-black sheen, as against greenish-black of all the other males. The wing of *alecto* is 95 mm., and it has a much bigger bill, and may be a separate species.

In Gould's "Handbook," i., p. 250, there is quoted Gilbert's interesting original field notes concerning the Shining Flycatcher at Port Essington and its nest.

Graucalus hypoleucus, Gould. White-bellied Cuckoo-Shrike.

One ♂, 1 ♀. Wing, 149 mm. Same as Macarthur River birds, which do not differ from North-West specimens (*parryi*, Mathews). North Queensland specimens have more grey on the breast, for which Mathews has suggested the name *stalkerii*. Wing, 153 mm.

Cisticola (exilis) lineocapilla, Gould. Grass-Warbler.

One ♂, 1 ♀. Strongly striped specimens, the male without the

usual rufous head. This little species is puzzling in its distribution. Between the strongly-marked extreme northern and southern races there appears to be a pale form, extending from the lower Gulf of Carpentaria country to North-West Australia, agreeing with either one of Mathews's three sub-species—*alexandræ*, *normani*, and *parryi*.

Malurus cruentatus, Gould. Red-backed Wren-Warbler.

Ryania melanocephala cruentata.

One ♂, wing 42 mm.; 3 ♂♂, immature, wing 40 mm. The colour of the mature male's back is a beautiful red, between spectrum and carmine. Gould's plate (No. 27, "Birds of Australia") is cleverly coloured to tone. North Queensland skins show a more scarlet colour (*pyrrhonota*, Mathews), while South Queensland and Northern New South Wales are still lighter—a distinct grenadine red (*melanocephalus*, Gould). There is little difference in the plain colour of the respective females. Mathews states that Port Essington is the type-locality of *cruentatus*. Gould's own evidence is "North-West Coast of Australia," and his reference (*P. Z. S.*, 1839, p. 143) is two years earlier than when Gilbert reached Port Essington. However, there is no appreciable difference between birds from the two localities, and in that case Ramsay's *bowyeri* would become a synonym, especially if the North-West be the actual type-locality.

Colluricincla brunnea, Gould. Brown Shrike-Thrush.

Two ♂♂, 1 ♀, showing reddish brow. Colour, a tone of wood-brown or drab above. North-Western birds (*parryi*, Mathews) which are like those from the Macarthur River (Gulf country) are paler and are not so dark about the throat and chest, but have the same wing (130 mm.)

Colluricincla parvula, Gould. Least Shrike-Thrush.

Conigravea p. parvula.

Two ♂♂ (wing 100 mm.), 1 ♀. Uniform olive-brown above, and the smallest of its kind.

Neositta leucoptera, Gould. White-winged Tree-runner.

Neositta pileata leucoptera.

One ♂, 1 ♀, 1 not sexed. Port Essington birds are darker in general coloration than those from North-West Australia, Gould's type-locality (*P. Z. S.*, 1839, p. 144), and which latter birds Mathews has named *napieri* (*broomei*) (*A. A. R.*, i., p. 95); but females are usually darker in this species than the males. In the specimen "not sexed" the black on the head extends below the sides of the face to the chin. Macarthur River and Brunette Downs examples are typical. Wing, 77-81 mm.

The R.A.O.U. "Check-list" probably correctly separates, specifically, this white-winged bird from the black-capped, brown-winged *N. pileata*.

Zosterops lutea, Gould. Yellow White-eye.

One ♂, 1 ♀. A perfect pair, and similar to *hecla*, and probably also to *tribulationis*—both Mathews's sub-species for North-West Australia. Wings alike (55 mm.)

Pardalotus uropygialis, Gould. Chestnut-rumped Pardalote.

Pardalotus melanocephalus uropygialis.

One ♂, 1 ♀, 1 immature. There appears to be some uncertainty whether the Gouldian type-locality of this interesting species is Arnhem Land or North-West Australia. Gould, in his letterpress, states the latter locality, while his fine plate * undoubtedly depicts birds from Port Essington. In the Territory specimens the lower back and upper tail coverts are not "chestnut" but are more golden (cadmium yellow), while the North-West birds have those parts light cadmium, and the flanks and under tail coverts are paler buff.

Melithreptus albogularis, Gould. White-throated Honey-eater.

Melithreptus lunulatus albogularis.

One ♂, 2 ♀♀. A plentiful species in Gilbert's time. Birds from North-West Australia (*sub-albogularis*, Mathews) and Macarthur River (Gulf country) both appear to be similar to type-locality specimens, there being little or no difference in size or in coloration.

Field observation points to *lunulatus* and *albogularis* being separate species. They are found in the same faunal locality, and are not migrants. For further remarks on this subject by G. H. Barnard and myself, see "Birds of Rockingham Bay," *Emu*, xvii., p. 31.

Myzomela erythrocephala, Gould. Red-headed Honey-eater.

Three ♂♂, 1 ♀. Fine skins. Gilbert found this beautiful little creature rare at Port Essington. Head deep spectrum red, or between that colour and carmine, like the back of *Malurus cruentatus*. Can find no difference in North-West examples (*derbyi*, Mathews). Moreover, North-West Australia is the actual type-locality (see Gould, *P. Z. S.*, 1839, p. 144); yet Gould, in his "Handbook," i., p. 556, states that all specimens that came under his notice were procured at Port Essington.

Myzomela obscura, Gould. Dusky Honey-eater.

Melomyza o. obscura.

Three ♂♂. Average length 146, wing 71, culmen 19, tarsus 19 mm. Nearly uniform drab or hair-brown colour, above and below. The North-East coastal (Cairns and Cardwell) birds are darker (clove-brown) above and browner (chestnut) underneath—*harterti*, Mathews. In this decision I have modified the view which I held with Mr. Barnard when our "Birds of Rockingham Bay" (*Emu*, xvii., p. 32) were published.

* "Birds of Australia," folio, ii., pl. 41.

Glyciphila fasciata, Gould. White-breasted Honey-eater.
Ryanornis f. fasciatus.

Three ♀♀. No appreciable difference in these type-locality birds and North-West ones. Average wing measurements—♀, 68 mm.; North-West (Napier Broome Bay), ♂, 71, ♀ 68 mm.

Conopophila albogularis, Gould. Rufous-breasted Honey-eater.

Four ♂♂. Have darker flanks than their near ally, *rufogularis*, and have a white throat and brown (buffy) breast mark.

Ptilotis unicolor, Gould. White-gaped Honey-eater.

Stomiopera u. unicolor.

One ♂, wing 98 mm.; 3 ♀♀, wing 87–90 mm. This unique bird, Gould records, “is one of the many species that rewarded Gilbert’s researches at Port Essington.” It is well named specifically, being of a uniform olive-brown appearance. It is not appreciably different from Gulf (Carpentaria) birds, or those from the North-West, which latter, however, may be a trifle (tint) lighter. One specimen in the “H. L. White Collection,” from Cairns, has a greenish hue—perhaps a seasonal or age-stage of plumage. If not, Mathews’s sub-species (*yarra*) is a good race.

Entomyza albipennis, Gould. White-quilled Honey-eater.

Entomyzon cyanotis albipennis.

One ♂, wing 150 mm.; 2 ♀♀. According to Gilbert, this is a “day-dawn bird”—one of the first heard at early morn. The white-winged *Entomyza* appears to be confined to the northern centre and North-West Australia, with no discernible sub-specific difference, while the bigger brown-winged birds range eastern Australia from north to south.

Philemon (citreogularis) sordidus, Gould. Little Friar-Bird.

Microphilemon orientalis sordidus.

Two ♂♂, 1 ♀. Another of the drab-coloured birds of the north. Smaller, buffy-brown, and not so greyish as the common species, *citreogularis*. Its near neighbour (*occidentalis*, Ramsay) in the North-West may be a trifle lighter. Some specimens exhibit a few yellow feathers on the breast, possibly due to immaturity. This Gilbertian bird has not been figured.

Tropidorhynchus argenteiceps, Gould. Silvery-crowned Friar-Bird.

Philemon a. argenteiceps.

Two ♂♂, wing 135–138 mm.; 1 ♀, wing 139 mm. Same drab-coloured back as in *Philemon sordidus*, and does not appreciably differ from Macarthur River (Territory) and North-West birds, the latter locality evidently being the true type-locality (see *P. Z. S.*, 1839, p. 144). Gould procured his original specimens from Ben. Bynoe, surgeon, H.M.S. *Beagle*, whom Gould met at Sydney.* That being so, Mr. Mathews can hardly sustain his sub. *broomei* for North-West Australia.

* “Handbook,” i., p. 548.

Poephila gouldiæ, Gould. Gouldian Grass-Finch.

Four ♂♂ (2 red-headed phase), 1 ♀, 2 ♂♂ (immature), 1 ♀ (immature). A useful series, and of most historic interest, besides the bird being an aviary favourite.

"It is with feelings of the purest affection," Gould modestly writes, "that I ventured in the folio edition to dedicate this lovely bird to the memory of my late wife, who for many years laboriously assisted me with her pencil, accompanied me to Australia, and cheerfully interested herself in all my pursuits."

Gilbert discovered the species on Greenhill Island, near Port Essington, where, he states, "it inhabited the edges of the mangroves and thickets. When disturbed it invariably flew to the topmost branches of the loftiest gums—a habit I have not before observed in any other member of the genus. Its note is a very mournful sound added to a double 'Twit.' Those I observed were feeding among the high grass, in small families of from four to seven in number, and were very shy."

Although the Territory is the type-locality of the species, it extends on either hand to North-West Australia and North Queensland. In the latter locality Mathews gives sub-specific rank to Ramsay's phase, *armiliana*, and adds one of his own, *kempi*, because of its "richer under surface" (*A. A. R.*, ii., p. 132). In the long and valuable series of skins of the Gouldian Finch in the "H. L. White Collection," nothing is richer-coloured than the mature males from the type-locality—Parrot or oil-green backs, dark mauve or dull bluish-violet breasts, and yellow (light cadmium) under parts. The greenish upper surface of some of the North-Western (Derby) birds, however, is slightly more yellowish.

Poephila personata, Gould. Masked Grass-Finch.

Neopoephila p. personata.

Three ♂♂, 1 ♀. Wings, 58 mm. Slightly darker or richer-coloured than those from other localities. However, some from Port Darwin (near the type-locality) are a little lighter-coloured, and agree with Napier Broome Bay (North-West) specimens—Mathews's *harterti*.

Neochmia phaeton, Homb. and Jacq. Crimson Finch.

Three ♂♂, 2 ♀♀. A nice series, and well-named "crimson" in tone of colour. Not a Gouldian-Gilbert type, but, as Gould states, Hombron and Jacquinot's bird was collected at Raffles Bay, "a locality closely bordering that in which Gilbert procured his specimens."

It is interesting to note, as Mathews has pointed out, that type-locality birds have a black crown instead of brown, as in North-West specimens (*fitzroyi*). The Territory birds, in general, are also more intensely coloured. There is less difference in the respective females.

Oriolus flavocinctus, King. Yellow Oriole.*Neomimela f. flavocinctus.*

One ♂, 1 ♀. Gilbert likewise procured a pair of these fine birds, which possess more black markings on the back than east and west coast specimens, but agree with the latter in their lighter (olive-yellow) under surface. East coast birds have a richer yellow (yellowish-citrine) above and below, and have more yellow in the light-coloured edgings of the wing feathers and tail tips, and are slightly larger. Two races can therefore be easily discerned visually—the type (*flavocinctus*), from North and North-West, and the more handsome *kingi*, Mathews, on the east.

Dimensions in mm. :—

<i>flavocinctus</i> —♂—	Length	268,	wing	140,	culmen	31,	tarsus	23.
♀—	"	272,	"	141,	"	32,	"	23.
<i>kingi</i> —♂—	"	288,	"	145,	"	32,	"	25.
♀—	"	300,	"	145,	"	35,	"	25.

Cracticus quoyi, Quoy. Quoy Butcher-Bird.*Melloria quoyi spaldingi.*

One ♂, wing 195; 1 ♀, wing 180 mm. Similar to east coast birds, which are a brighter black. Wing of eastern specimens 170–175 mm. Masters's *spaldingi* may stand, but Gilbert first procured this black Butcher-Bird—a mangrove, mud-loving, crab-hunter.

Cracticus (nigrogularis) picatus, Gould. Pied Butcher-Bird.

Two ♀♀. Similar to North-West examples, also to those from Macarthur River, but the black portions of the plumage are not so intense, nor the white parts so pure; tail and primaries are also browner.

Length 294–305, wing 150–155, culmen 30–35, tarsus 30–32 mm.

Cracticus argenteus, Gould. Silvery-backed Butcher-Bird.*Bulestes torquatus argenteus.*

Three ♂♂ (1 immature). Length 265–282, wing 140–147, culmen 38–39, tarsus 28 mm. In the common species (*destructor* or *torquatus*) the black on the head dissolves into the dark back, whereas in *argenteus* a deep black head is clearly defined against a grey (neutral) back. The general under surface is also whiter. It is a nice question if the two are specifically distinct, unless the bird obtained in North Queensland be considered intermediate, and links up with the larger southern form (*destructor*).

Again, Mathews is answerable in his "1913 List" for stating that the type-locality of this bird is "Port Essington." If students will refer to the original description (*P. Z. S.*, London, 1840, p. 126), they will find that Gould gives "North-West Coast of Australia" as the bird's habitat, and that he obtained the specimen from Capt. Gray, of H.M.S. *Beagle*.

Four Ornithological Trips to the Nullabor Plains.

BY (CAPT.) S. A. WHITE, C.M.B.O.U., PAST PRESIDENT R.A.O.U.

THE Nullabor Plains and the country in between the plains and Port Augusta had a very strong calling for the writer for many years, because I was of the opinion that it must hold many ornithological surprises. My wife and I had almost penetrated the great plains when we went beyond the Gawler Ranges, and I had outflanked them from the north when on the North-Western expedition. It remains now, after visiting several times the district in question, to record my disappointments. It may be as well, before proceeding with the narrative of my trips to the Nullabor Plains and surrounding districts, to say a few words about the formation of the country. After leaving Port Augusta stony table-lands are met with (same as pertain many hundreds of miles to the north), then myall and salt-bush flats. Before reaching Tarcoola more sandy conditions prevail, when mulga (*Acacia aneura*) and black oak (*Casuarina*, sp. ?) and other shrubs are seen. Less than a hundred miles from Tarcoola brings us to the edge of the great sand-hills, which extend for another hundred miles. The sand-hills run almost parallel to north of west and south of east; they are formed by the wind, and only have a few hundred yards of flat country in between each ridge. They are covered in a fairly dense scrub, acacias predominating. These sand-hills stop abruptly near Ooldea native well, and a vast level limestone area covered in salt-bush and blue-bush stretches out as far as the eye can reach, and hundreds of miles beyond. Here and there, miles apart, a stunted bush may be seen, chiefly "dead finish" (*Acacia rigens*), but not a tree for many hundreds of miles. The effect is monotonous in the extreme, especially during dry seasons, which, I am sorry to say, predominate. I had the pleasure to see the plain like a wheat-field of waving spear-grass, but, like the central regions, it soon dries up and becomes a parched and desolate country. There is some controversy about the correct spelling of the name of these wonderful plains. Some say it is "Nullarbor," from the Latin "null-arbor," meaning "treeless." I do not put any reliance on this statement, for it is far more likely that it is derived from a native name: the aborigines use the term "nulla" very much.

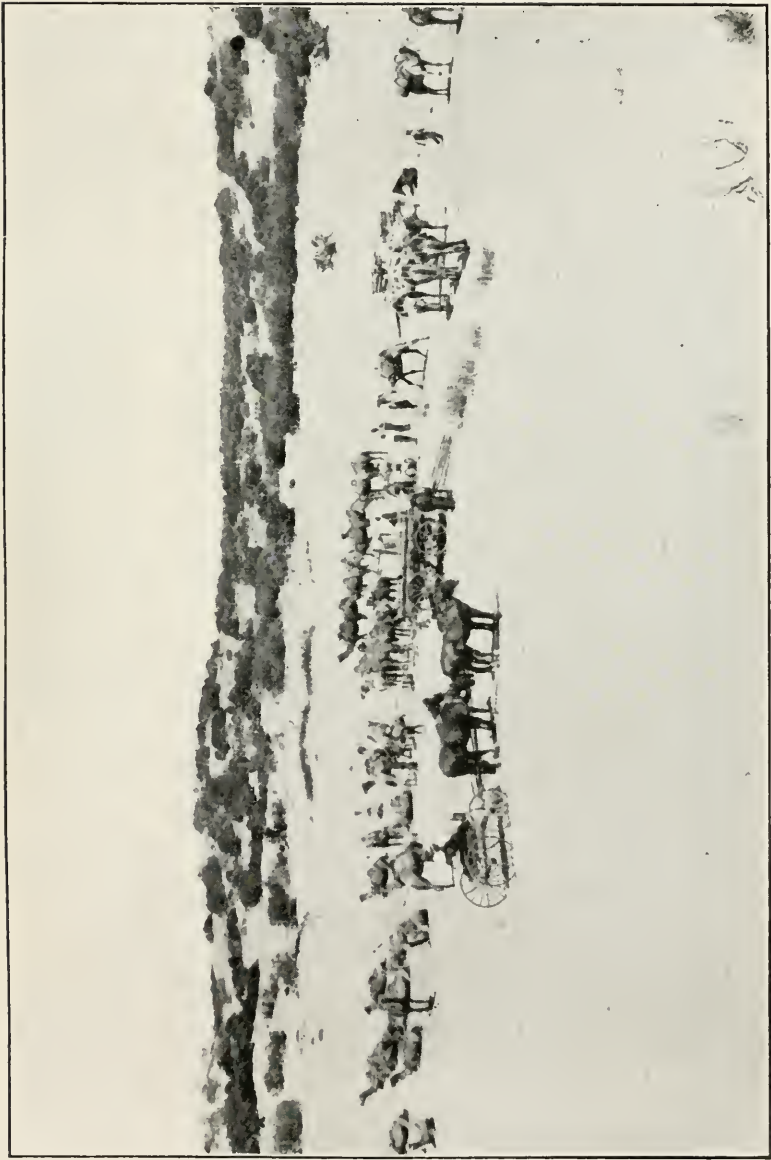
The great table-land or plain, which is between 500 and 600 feet above the sea-level, was once below it, when a great bay or gulf extended almost into the centre of the continent. The very numerous casts of marine life which lived on the sea-bed in those times have been gradually raised to the present level, and clearly show us the age of the great limestone deposit. One of the most remarkable features of this region is the total absence of any rivers or creeks, or even a rivulet; the whole country is like a sieve, and when rain falls—which is seldom—it soaks right away.

Water has been procured all across the plains, but it is all salt. The numerous caverns with small openings in the limestone crust, which are generally called "blow-holes," are a characteristic feature of these vast plains, but of these I shall speak again later on. It must be borne in mind that the region dealt with in this paper is from 90 to 120 miles from the coast line.

When the East-West railway line had reached within 30 miles of Ooldea and the Nullabor Plains I made up my mind to visit the district. My entomological friend, Mr. Arthur M. Lea, expressed a wish to accompany me, so we went up together.

Leaving Adelaide in the early morning, we reached Port Augusta the same evening. Next day we were shown over the loco. works, and Mr. Lea made an attempt at collecting, but had little success. We left Port Augusta at midnight by a so-called express bound for the "head of the road." During that night and the following day I met with one of the greatest experiences of my life. I have travelled in many countries and amongst many peoples, but the train-load (many hundreds) of navvies returning to the "head of the road" after having spent a holiday was beyond description. Anyway, we reached the end of the line in the early hours of a January morning of 1917. Pulling out our blankets, we were glad to lie down and snatch a few hours of sleep. Almost before there was any light in the sky, Mr. Lea was out with his sweep net, and came back in great delight with a very rare fly. There were few bird calls that morning; those which I identified were the Butcher-Bird, the Singing Honey-eater, the White-browed Babbler, and a few others. After a battle with the flies for some breakfast we left the head of the road in a conveyance drawn by four powerful horses. At first this seemed an unnecessarily strong team, but when we got into the high sand-hills, which rose one after another for hours and hours, there only being a few hundred yards between each ridge, we soon found the team was none too powerful for its work.

Reaching Ooldea condensers in the afternoon of 8th January, we started our work. The country for some distance round the camp was searched—my friend and companion after beetles and other insects, the writer bird and plant life. Birds were not plentiful, this being no doubt due to want of water. Some desert forms were met with, such as the Red-backed Kingfisher; the plaintive call of this bird, which resembles the words "Chow, chow," came from many directions that still, hot morning. As the day advanced the heat became more intense, and the Kingfishers, like many other birds, became silent. A small party of Black Magpies (*Strepera*) attracted my attention by their loud calls, but they were so wary that it was impossible to identify the species to which they belonged. In the early morning the Rufous-vented Shrike-Thrush was calling loudly; this species, closely allied to our *C. harmonica*, is an overlapping western form. Although the western bird has a fine note, still it is not so liquid and musical, in my opinion, as that of our more eastern form.



Ookdea Native Well.

PHOTO. BY CAPT. S. A. WHITE, C.M.B.O.U.



Parakylia, on the leaves of which Bustards and other birds feed ;
they can then do without water for some time.



Cats' Tails (*Trichinium exaltatus*), frequented by many insects on
which birds feed.

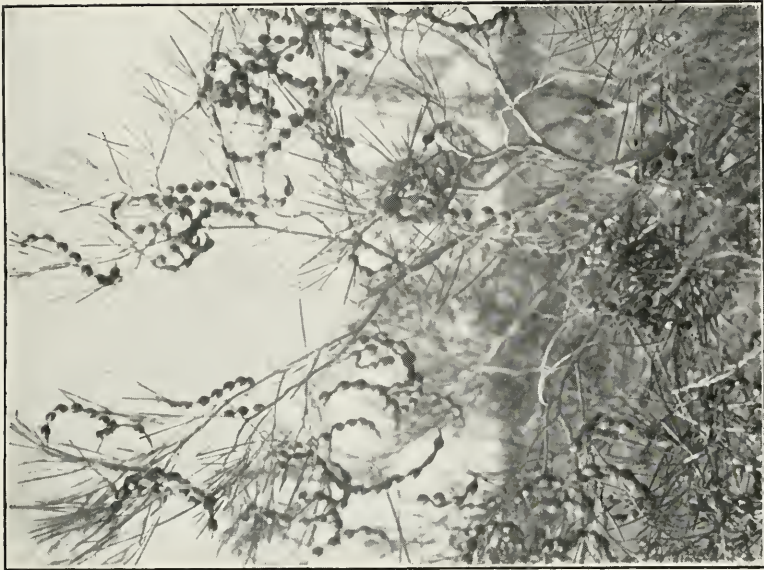
White-browed Babblers were met with in parties. The Little Brown Flycatcher, Red-capped Robins, Western Brown Hawk, Hooded Robins, Tree-Tits, Yellow-plumed Honey-eater, and Redthroat were all seen. The vegetation covering the sand-hills is confined to low scrub, with here and there a black oak or a bunch of mallee. The scrub is made up of many species of shrubs, apart from the oaks (*Casuarina*), which are very sparingly scattered over the country. The next in size are the Grevilleas; there are two large species, both bearing beautiful honey-laden blossoms, but the seed-pods or fruit differ considerably. *Grevillea stenobotrya* has a small, delicate seed-pod of a flattened nature, while *G. pterosperma* has a large, woody, and much-rounded pod, of a much darker coloration. The flowers of these plants produce a wealth of food for the honey-feeding birds. Acacias, of course, are well represented, and many of their seeds form food for Pigeons and other birds, *Acacia randelleana* being a new record for South Australia, it having been hitherto known only in Western Australia. *Acacia saleæsa* was very attractive, owing to the bushes being covered in very large seed-pods of a very bright green coloration. Our well-known botanist, Mr. J. M. Black, to whom I am greatly indebted for working out all my botanical collections for years past, asked me to keep a sharp lookout for a very large fruiting mulga, and I was pleased to find one of these shrubs bearing large cylindrical seed-pods, which has been identified as *Acacia linophylla*. I met with this species in the Everard Ranges, but could not, owing to the long drought, find a plant in fruit. Returning to camp, every stitch on us was saturated with perspiration. In a hessian-covered hut where we had our meals the thermometer stood at 117° Fahr., and it can be easily understood the state of the birds which had to be made into skins that night. A little rain (thunder drops) fell during the night, and the next day the flies were unbearable. Each day came and went with heat and flies, but we worked steadily on, each making a collection of our special branches of natural science. Mr. Lea is a keen collector, and puts much enthusiasm into his work. He would come back to camp after a tramp over the sand-hills with perspiration trickling down his face, yet he would be beaming with delight as he held up some specimen, saying, "A beauty! A beauty!" At night Mr. Lea was busy with his gas lamp, and when my curing of specimens was finished we would sit round the lamp watching for insects attracted by the light. One evening a reddish-brown beetle came flying round with a booming sound, and pitched on the ground in front of us. The entomologist was on to it like lightning, exclaiming "At last I have it!" It turned out to be *Pararhopsea gigas*, Lea, a rare beetle, having been collected by R. T. Maurice during one of his exploring trips in that locality, and had never been described till now by my friend. I had found parts of this insect in the sand, but had despaired of taking it alive.

Having finished our work in the district, one morning at day-

break we found a riding camel and one on which to pack our luggage tied up close to the camp. I mounted the riding camel, and, with Mr. Lea behind me, I was soon punching one of my old northern acquaintances along the sandy track which led to the head of the road. We were lucky enough to fall in with a Ministerial train, by which we had a good run into Port Augusta.

SECOND TRIP.

Towards the end of May I was again in Port Augusta on my way along the East-West railway, this time to investigate the Sparrow question for the Commonwealth Advisory Council for Science and Industry. There being no Sparrows in Western Australia, the people in those parts are naturally fearful that these imported pests may find their way over from South Australia by means of the East-West railway track. This time I went up by the pay train, and I was able to make inquiries all along the line. It was found that the Sparrows had not reached Tarcoola up to that time (they have now reached there). When the head of the road was reached, Superintendent Tom Ash informed me it was reported that Sparrows had been seen between the rail head and Ooldea, so the next day or so were occupied in gathering information along the works of construction. Little valuable information could be obtained. There were very few birds, and the only additions to the list already made were the Bee-eater, White-backed Swallow, and Small-billed Crow. A good many botanical specimens were collected upon this trip; this was owing to the long and numerous stoppings along the line to pay the men. One of the most attractive plants growing amongst the sand-hills is the so-called tea-tree (*Leptospermum laevigatum*, var. *minus*), and it was covered in white blossoms at the time of my visit. In many places Sturt's desert rose (*Hibiscus pinoneanus*) was in full flower, and large bushes covered in handsome bluish blossoms were often met with. The shapely boronia bushes (*B. corraeus*) was fairly plentiful, and the kangaroo bush (*Phacelia scoparia*) was often seen, and the honey-loving birds seemed to obtain much food from the bright puce flowers of this bush. The yellow and rigid-flowering *Helichrysum bracteatum* and the showy yellow heads of *H. apiculatum* were a feature of the landscape. In many places the sand-hills were white with the pretty little everlasting *Helipterum floribundum*. The birds were attracted by the flowering mallee (*Eucalyptus inocanita*), which grew from 20 to 25 feet high and in January was covered in white blossoms. There were many more species of plants, two of which proved new to science and one or two fresh records for South Australia, three of these plants having been hitherto recorded only for Western Australia. It is to be hoped that the bushes and low vegetation are not destroyed, or even touched, in the sand-hill country, for should it be destroyed this country will become a howling wilderness of drifting sand.



The Fruit of *Acacia Randalliana*, the food of many desert birds.

PHOTO. BY CAPT. S. A. WHITE, C.M.B.O.U.



Grevillea stenolotrya, a plant of importance to desert Honey-eaters.

PHOTO. BY CAPT. S. A. WHITE, C.M.B.O.U.



A Limestone "Blow-hole," in which Owls roost.



A Granite Rock Hole, in which water can persist for some time.

THIRD TRIP.

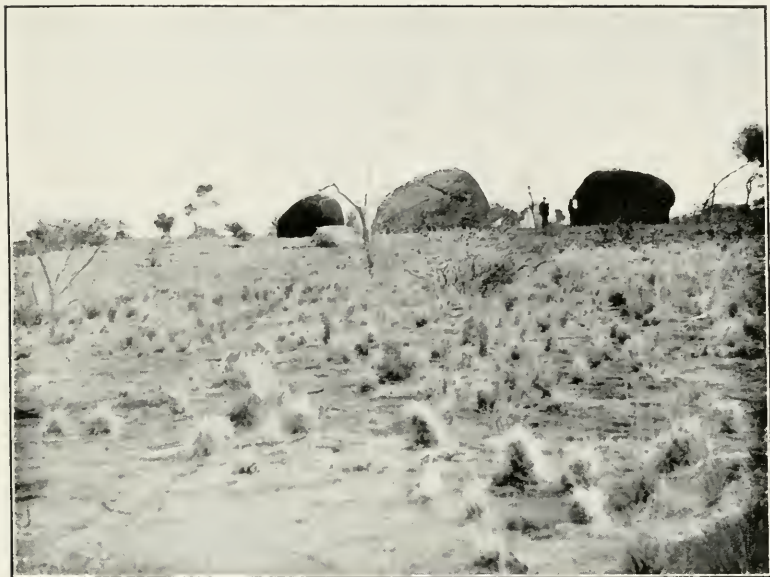
In December, 1917, the writer was on his way again to the historic Ooldea. By this time the luxurious "Great Western Express" had taken the place of the slow freights, tea and sugar, and pay trains. Being met at Port Augusta by the supervising engineer (Capt. Saunders), I left by the 10.45 express, and interviewed several persons on the way who are assisting with the destruction of the Sparrow. Ooldea was reached in the evening of the second day. Here I had comfortable quarters arranged for me, and the next day set about my work. A very severe heat spell set in, and the first day was 116° Fahr. in the shade. It having been reported that Sparrows had been seen in this camp, on the edge of the Nullabor Plains, I searched it well every day. I was there both morning and evening, but not a trace of the birds was I able to pick up. I feel sure that one of our native birds, the Whiteface (*Aphelocephala leucopsis*), has been many times mistaken for the imported Sparrow.

At 10 a.m. a start was made for Ooldea native well, or soak, every assistance being rendered by the Commonwealth officials. I first visited the two wells put down by A. H. Tietkins, F.R.G.S., of which I have already made mention. Examining large heaps of stone and *débris* which had been thrown out of these wells, it was seen that from 50 to 60 feet down a vast mass of casts of sea-shells existed; many of the casts are very perfect, showing great detail in markings. Upon examining these wells more closely it was found that they were tenanted by Screech or Barn Owls. When a noise was made at the top of the well these strange birds stretched out their necks from where they were perched, upon ledges of rock in the walls, and turned their strange disc faces first to one side and then to the other, to see what the commotion on top was. Many attempts were made to flush the birds from the well, without effect, and it was only when I was lowered into the well that these birds could be examined closely. I next paid attention to some blow-holes out upon the plain. These holes are numerous, and pass down into the darkness, how deeply no one knows; others go down in a shelving manner, with roughly terraced steps. These blow-holes are a remarkable feature of the limestone plain. There is a continual draught one way or the other, either up or down, and in some places a strong saline smell was very apparent, and in some instances one could detect a seaweed odour; this may be fancy, still it is the opinion of many that the strong current of air passing in and out is caused by the incoming or outgoing tides, which pass up under the plain for many miles. In some cases the current of air is very strong, and I found it useless to descend with a light other than a hurricane lamp, and as I was lowered into the darkness my hair was carried up straight by the air rushing up past me. It was found, as with the old wells, that many of the blow-holes were tenanted by the Owls, and it was a weird sight, being suspended by a rope deeper and deeper into the darkness, to see Owls of all

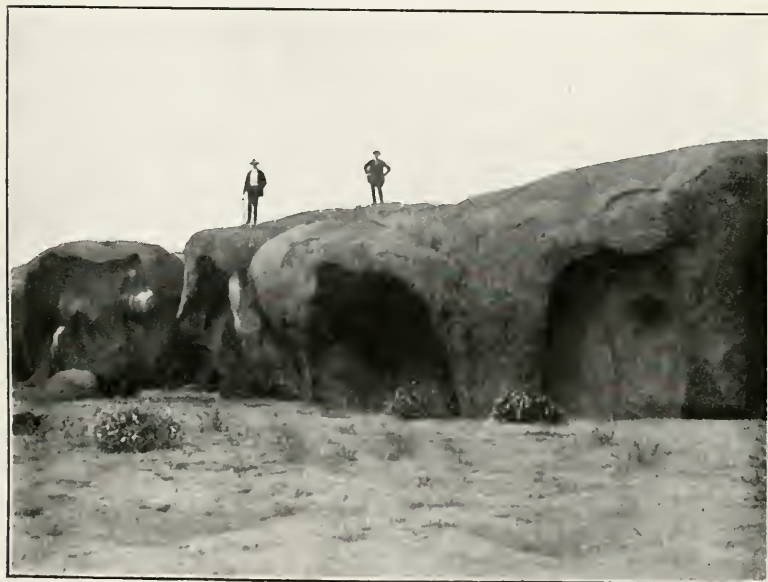
ages gazing at me from the ledges of rock. The Owls did not go down any great depth. Many of the young birds had been taken from their nesting-places in the blow-holes and conveyed to the railway camps to be kept as pets. This is to be regretted, because Owls do not make good pets, owing to their being flesh-eaters, and when in captivity their surroundings are not sweet; another thing, being confined in boxes, they have no room to move about, and are therefore anything but happy. Seeing that these birds destroy hundreds upon hundreds of rabbits, mice, rats, as well as millions of noxious night-flying insects, such useful birds should be allowed their freedom to carry out the work for which they were created. Leaving the plain, the sand-hills were entered, and, after a heavy pull through drift sand covered in low scrub (mostly *Acacia* and *Cassia*), Ooldea native well was reached. This native well, or soak, is situated in the centre of an almost circular depression, and all the water taken inside this basin seemingly gravitates to the centre, where there is a thin clay bottom, and this forms the well. This watering-place must have been known to the natives for generations upon generations, for all over the bare sloping sand-hills numbers of stone and flint chippings are to be seen; there are distinct traces of many fires, portions of grinding stones, and many evidences of the former owners of the country. There were relics of happy days for them, when they made their spear-heads, kurries, &c., held their corroborees, and hunted over the sand-hills and plains. We left the spot where that adventurous spirit, the late R. T. Maurice, camped many a time when exploring this country. If he could only see it now I am sure he would not know it, with hundreds of reeking, sweating camels waiting for their loads of water for the railway siding at Ooldea. Leaving the native well by another route, it was not long before some wonderful flowering gums or mallee were met with; this is known to the botanist as *Eucalyptus pyriformis*. The flowers are of two colours, crimson and creamy-white, growing in clusters, and each flower is over two inches across. The tree is a low, stunted mallee form, but when met with in full blossom, amid the dry, hot sand-hills, it is a surprise indeed. At the time of my visit the flowering season was nearly over, and the sand under the trees was strewn with huge capsules from the flower-pods.

FOURTH TRIP.

On 21st May, 1918, I was again on the move west, and most of my work was done round Tarcoola, the Sparrows having reached that station. I set about destroying them, and the men who are assisting me have accounted for most of the Sparrows already. Apart from my work with the Sparrows, I was able to do a good deal of bird-observing, for I visited all the rock-holes in the vicinity to see if the Sparrows were drinking at them. Short-billed Crows were very numerous in the township, and were acting as scavengers. Pipits were seen close to the dwellings. Crested-



Granite Boulders, a desert feature of importance to bird-life.



Granite Rocks, containing holes at which birds get water.

Pigeons were also seen, and Whitefaces were plentiful. Round the rock-holes a good many birds were observed, amongst them Many-coloured Parrots, Shell Parrots, Central Australian Ring-neck, Hooded Robin, Tricoloured Chat, Yellow-fronted Chat, and the Chestnut-eared Finch, the last-named being in thousands.

The following is a list of birds collected or observed during my several trips into the Nullabor Plains and surrounding country. I believe I have the honour to be the first to publish a list of the birds or give any detailed account of the ornithology of this region. The number of species or individuals varies very much, according to the kind of season and the time of the year. The country is mostly destitute of fresh water in midsummer, and the birds have in most cases to move from the waterless region to the vicinity of rock-holes, so that in many places where the birds were fairly numerous in the cooler months of the year, by January, when the rock-holes had dried up, the country would be found almost destitute of bird-life.

The nomenclature is after Gregory M. Mathews's "1913 List." To comply with the R.A.O.U. wishes, the official "Check-list" names are in parenthesis where they differ from those given by Mathews.

Dromiceius n. novæhollandiæ (*Dromaius novæ-hollandiæ*). Emu.—Although the bird was not seen, it must still inhabit parts of the country, for the natives depict their tracks in numerous paintings on the rocks.

Coturnix p. pectoralis. Stubble Quail.—These birds were met with on the Nullabor Plains during the good season, but they were not plentiful, and quite absent ever since.

Ocyphaps lophotes. Crested-Pigeon.—These birds were numerous round Tarcoola, and an odd bird or two was seen at Wymbring. I am afraid the railway people destroyed these birds whenever they came in contact with them. I did not see them in the vicinity of the Nullabor.

Lobibyx novæhollandiæ (*Lobivanellus lobatus*). Spur-winged Plover.—A small party of these birds was seen near a clay-pan between Port Augusta and Tarcoola.

Elseya m. melanops (*Ægialitis nigrifrons*). Black-fronted Dottrel.—A few birds seen at Lake Hart.

Recurvirostra novæhollandiæ (*R. rubricollis*). Red-necked Avocet.—Three birds observed in a salt-water hole near Lake Hart.

Austrotis australis (*Choriotis australis*). Australian Bustard.—During good seasons these birds are to be seen on the Nullabor Plains. They were seen in the mulga country between Wymbring and Ooldea, also round Tarcoola.

Carpibis spinicollis. Straw-necked Ibis.—Several of these birds seen during the good season out upon the Nullabor Plains; they were feeding upon large grasshoppers.

Uroæetus audax. Wedge-tailed Eagle.—Several of these birds came under observation, and two immature birds were kept captive by the railway people at Wymbring.

Ieracidea berigora occidentalis (*Hieracidea occidentalis*). Western Brown Hawk.—A good many of these birds came under notice, and they were all of the coastal type. In one instance I saw an adult bird carrying a snake to feed its young. There are without doubt two forms of this bird—one, an interior bird, being very ruddy on the back, and having a light breast, which I class as *I. berigora*; and a coastal form of almost uniform dark colour (*I. occidentalis*).

Tyto alba delicatula (*Strix novæ-hollandiæ*). Masked Owl.—The first specimen which came under notice was flushed from a thick bush in the sand-hill country, and it appeared to me to resemble *Tyto novæhollandiæ* more than *delicatula*. All those examined afterwards on the plain showed no variation from our commoner *delicatula*. There must be a great number of these birds out upon the plains, for nearly every blow-hole was found to contain them, which are their breeding-places. Many young birds were seen in captivity with the railway people, and I was the means of liberating many, owing to their being confined in small boxes.

Lophochroa leadbeateri (*Cacatua leadbeateri*). Pink Cockatoo.—Several small parties of these birds were seen travelling in the early morning towards the north-east, and there is little doubt they were making to some rock-holes in that direction for water. Some wood-cutters connected with the railway, who were working in the black oak country, brought in some young birds to the line at Ooldea.

Barnardius zonarius myrtæ (S. A. White, *Trans. Roy. Soc. of South Aust.*, vol. xxxix., 1915). Central Australian Yellow-banded Parrot.—It was a surprise to find that the range of this fine bird extended to the Ooldea sand-hills and to Tarcoola; this gives it a very wide range from the MacDonnell Ranges. They do not seem to stay in the sand-hill country all the summer, but as soon as it gets dry they must make to large rock-holes which hold water all through the year. A very fine specimen of this bird is kept in captivity in Tarcoola.

Psephotus varius rosinæ (*P. multicolor*). Many-coloured Parrot.—Several of these birds were seen watering at "Culloden rock-holes." The bird is not numerous anywhere, but thinly distributed over the mulga country.

Melopsittacus undulatus. Warbling Grass-Parrot or Shell-Parrot.—One or two small parties were observed.

Cyanalecyon pyrrhopygius (*Halcyon pyrrhopygius*). Red-backed Kingfisher.—These birds were fairly plentiful all through the sand-hill country, and, in spite of the degrees, they remained throughout the year. In the early mornings their mournful call of "Chow, chow" would be heard, but in the summer, as the heat of the day came on, they would become silent. They were nesting in the cuttings through the sand-hills.

Cosmærops ornatus (*Merops ornatus*). Australian Bee-eater.—These beautiful birds were fairly plentiful round Ooldea during the summer.

Hirundo neoxena. Welcome Swallow.—Quite a common bird at Tarcoola.

Cheramœca leucosternum. Black-and-White Swallow.—These birds were often seen in the sand-hill country.

Microeca fascians assimilis (*M. assimilis*). Lesser Brown Fly-catcher.—These birds were not numerous; an occasional one seen in the open scrub country.

Whiteornis goodenovii (*Petroica goodenovii*). Red-capped Robin.—Not numerous; thinly scattered through the mulga country.

Melanodryas cucullata vigorsi (*M. bicolor*). Southern Hooded-Robin.—These birds seem to frequent the table-land as well as sand-hill country.

Smicrorhis brevirostris (sub-sp. ?). Tree-Tit.—These little birds come between *viridescens* and the interior bird *S. b. mathewsi* (S. A. White, *Trans. Roy. Soc. of South Aust.*, vol. xxxix., 1915). They were not plentiful—an odd pair or so seen amongst the mallee clumps.

Leucocircia tricolor (*Rhipidura motacilloides*). Black-and-White Fantail.—A few of these companionable little birds were met with; it is very seldom one finds a district without them.

Lalage tricolor (*Campephaga humeralis*). White-shouldered Caterpillar-eater.—Two of these birds were met with in the mulga scrub.

Cinclosoma castanotum. Chestnut-backed Ground-Bird.—These birds were met with in the Ooldea sand-hills, but seldom seen.

Morganornis superciliosus (*Pomatorhinus superciliosus*). White-browed Babbler.—This was a common bird all over the country under notice, and their stick nests were seen in nearly every thick bush.

Parephthianura tricolor (*Ephthianura tricolor*). Tricoloured Chat.—A large flock, associating with the following species, was seen at one of the rock-holes.

Aurephthianura aurifrons (*E. aurifrons*). Orange-fronted Chat.—A large flock, mingling with preceding species, was seen watering at one of the rock-holes.

Acanthiza pusilla consobrina (*A. pusilla*). Pale Red-rumped Tit.—Met with in several localities, but nowhere plentiful. Did not see any signs of breeding.

Acanthiza iredalei morgani (*A. morgani*). Southern Thin-billed Tit.—A small party of these birds was met with upon the Nullabor Plains, amongst the blue-bush. They were searching amongst the bushes and over the ground for insect life. The country was exceedingly dry, and no fresh water for many miles.

Malurus callainus. Turquoise Wren.—Upon my first trip into the Ooldea country I had seen several parties of brown Wrens, but, do what I would, could not get a glimpse of a blue bird, and, from descriptions given me, expected to find a new species. Upon a later trip I secured a full-plumaged male, and found upon comparison that it did not differ at all from skins procured from my father's type-locality. The birds were found in small parties in the thick scrub growing on the Ooldea sand-hills; they were also observed near Tarcoola.

Colluricincla rufigentris. Buff-bellied Shrike-Thrush.—As would be expected, this is the only member of the genus found in such dry

country. They were fairly plentiful in the scrub near Ooldea, but their beautiful note is not often heard amidst the hot, dry sand-hills:

Bulestes torquatus ethelæ (*Cracticus destructor*). Southern Butcher-Bird.—These birds were not plentiful; an odd bird or two scattered over the whole of the country.

Oreoica cristata. Crested Bell-Bird.—Thinly dispersed through the scrubby country. A nest discovered had the usual adornment of many hairy caterpillars in all stages of helplessness.

Aphelocephala leucopsis. Whiteface.—These birds were found all through the country, in the scrub as well as on the stony table-lands.

Austrodicæum hirundinaceum (*Dicæum hirundinaceum*). Mistletoe-Bird.—The unmistakable call of this bird was heard amongst the branches of the mistletoe near Ooldea.

Mellthreptus atricapillus augustus (*M. brevirostris*). Port Augusta Brown-headed Honey-eater.—These little birds were met with in the scrub round Ooldea.

Glceiphila albifrons. White-fronted Honey-eater.—These birds were fairly plentiful in the sand-hill country, where they were found breeding.

Melliphaga sonora (*Ptilotis sonora*). Singing Honey-eater.—This bird was found all through the country visited.

Lichenostomus ornatus (*Ptilotis ornata*). Yellow-plumed Honey-eater.—These ornate little birds were found in clumps of flowering mallee at Ooldea.

Lichenostomus plumulus ethelæ (*Ptilotis plumula*). Southern Yellow-fronted Honey-eater.—These Honey-eaters were fairly plentiful in the scrub covering the sand-hills; they seem to agree in every respect with the birds found near Port Augusta, the type-locality.

Myzantha flavigula. Yellow-throated Miner.—This is a common bird all through the country; is noisy and pugnacious.

Acanthogenys rufogularis. Spiny-cheeked Honey-eater.—These birds were met with in many localities, but they were nowhere plentiful.

Anthus australis. Australian Pipit.—They were often seen at the railway sidings, hanging round the tanks when fresh water was dripping from the taps; did not see them on the plain nor in the scrub away from the line.

Tæniopygia castanotis. Chestnut-eared Finch.—These birds were very numerous round the rock-holes, or wherever they could get fresh water.

Corvus bennetti. Short-billed Crow.—Very plentiful at Tarcoola, where they act as scavengers. Did not see them often in the scrub; an odd bird or two flying over.

Strepera (sp. ?) Crow-Shrike.—Birds were seen upon several occasions, but they were too wary to allow me to get within range. I would expect them to be *S. plumbea*.

The Nesting Habits of the Grass-Warbler (*Cisticola exilis*).

BY DONALD THOMSON, R.A.O.U., CANTERBURY (VIC.)

DOWN among the grassy river flats which border the Yarra River for many miles of its upper reaches, where acres of tall seeding docks and luxuriant grass lands are studded with innumerable quiet lagoons, whose margins are hidden by a wealth of tall bulrushes, sedges, and other water plants, the little Grass-Warbler (*Cisticola exilis*) delights to have its home.

Even before one actually reaches the home of this beautiful little bird, its sharp, wheezing, but not piercing call is plainly audible, wafted to the ears by soft spring breezes. At first it appears to come from the clear azure above, then from the right or left, and then when the bird at last is seen it will probably be in quite a different direction from that from which it at first appeared to come. Thus it would seem that this bird has the wonderful natural gift of ventriloquism.

Approaching carefully, seeking cover among the tall docks, and keeping very still, the birds at last are reassured. Then from the shelter of a clump of reeds a bird flits and settles near at hand. His colour is a dark rusty brown, with darker markings of black on the head, back, and wings, and the pale buff of the breast, fading almost to white on the throat, is clearly seen. Seeing that all is safe, the bird has a high flight in the air, at the same time uttering the loud wheezing cry, and finally alighting on a clump of rushes not far away from his starting-place. The aerial journeys are taken very often during the hot spring days and in the quiet stillness after sunset. These birds seldom enter the clump of vegetation in which their nest is hidden by direct flight, even if certain of security from observation. They alight some little distance away and then "creep" from stalk to stalk, always low down, until the nest is eventually reached.

At last, as the November sun sinks to rest over the western gums which border the river, a still quietness reigns everywhere. Even the little Grass-Warblers are not so noisy now. On almost every clump of finely-grown reeds a bird sits, swaying on the topmost seed-head. As if conscious of the presence of a watcher—I shall not say enemy—they flit from clump to clump uneasily, always selecting a tall plant on which to alight. Slowly, very slowly, a bird approaches my "lair." He flies to within a few feet of my hiding place, always to make a short aerial journey, landing a little further away. Returning slowly once more, he at last evidently makes up his mind to take the risks and return "home," for, diving into the undergrowth, he is lost to view. Soon a bird would appear close at hand once more, this time with some "down" or other building material in its mouth, and, flitting about, would finally vanish below. Most of the nest-building appears to be done at sunrise and just about sunset—that is, in the cooler and quieter hours of the day.

Judging from the action of the birds that a nest was being built close at hand, I began a thorough search in the long grass. This search soon revealed the wonderful domed, cradle-like nest, low down amongst the green herbage. It was placed about four inches from the ground, and was composed of fairly coarse grasses felted together and lined with fine white thistledown and seeds. From a short distance this nest had the appearance of being quite white, studded with dark spots, which were the seeds, the surrounding grasses and leaves of the plants being drawn down over the nest and fastened with cobweb threads. The opening in the side was large for the size of the bird, and faced the east. So frail was the whole structure that it appeared quite incapable of supporting the weight even of the tiny owner, much less withstanding the heavy summer rains or breezes. The nest contained four eggs of a blue ground colour, spotted towards the larger end with brown markings, and quite oval in shape. By the actions of the birds it would appear that, although the eggs were far incubated at that time, the nest was being added to by the birds, in the evenings chiefly.

A Bush Walk.

BY H. STUART DOVE, F.Z.S., R.A.O.U., WEST DEVONPORT (TAS.)

AT the beginning of the fourth week of September I took a day out in the bush near Devonport in order to see what spring migrants had arrived and which were still to come. The growth hereabouts consists mainly of stringybarks and white gums, under which is a scrub of prickly and varnish wattles, *Pultenæas* of various species, tea-trees of several kinds, *Cassinias*, and an occasional honeysuckle bush. The prickly wattles were a beautiful sight on that sunny morning, being loaded with "spikes" of pale yellow blossom. The notes of the Fan-tailed Cuckoo (*Cacomantis flabelliformis*) rippled pleasingly from various trees, the sound seeming to be permeated with the very soul of spring. The somewhat plaintive series of notes (usually eight in succession, then a pause) uttered by the pretty Bronze-Cuckoo (*Chalcococcyx plagosus*) was also frequently heard, although this bird does not thrust itself upon our notice as does the larger Fan-tailed Cuckoo. The Narrow-billed Bronze-Cuckoo (*C. basalis*) is also plentiful here, but whether its call is exactly similar to that of *C. plagosus* is a moot point. I think not, but there is a great likeness in the notes of all the *Chalcococcyx* genus. For instance, the cry of the Shining Bronze (*C. lucidus*), which visits New Zealand each year, is well described by Sir Walter Buller, and his description would apply equally well to those of our Tasmanian visitors:—"The cry is a remarkable one, the bird appearing to be endowed with a peculiar kind of ventriloquism. It consists of eight or ten long silvery notes quickly repeated.

The first of these appears to come from a considerable distance; each successive one brings the voice nearer, till it issues from the spot where the performer is actually perched, perhaps only a few yards away." This ventriloquial quality I have frequently noticed in the call of the Bronze-Cuckoo on our coast, and it is also very perceptible in individual songs of our sweet little lyrist, the Striated Field-Wren (*Calamanthus fuliginosus*).

To resume our bush walk. Besides the three species of Cuckoos already mentioned, there is another, the largest of the family which comes to our island, and that is the well-known Pallid Cuckoo (*Cuculus pallidus*), with its scale of rapid crescendo notes so often repeated as to be positively wearisome on a warm day. This kind has a great affection for the telegraph and electric-light wires which border our roads, and it is difficult to take a walk from September to April without passing several members of this "shrieking sisterhood" (or brotherhood) seated thus, and vociferating for all they are worth.

The Summer-Bird (*Graucalus parvirostris*) is another of our September arrivals, and lends grace to the landscape with its pretty soft-grey plumage and undulating flight. This bird has two peculiarities—one is the call, which is quite unlike that of any other genus with which I am acquainted, and may truly be described as *sui generis*. The best approach I have seen to description is that calling it "a soft rolling or purring note." The other distinction of the *Graucalus* is its invariable habit, after alighting on a tree or stump, of flicking up first one wing, then the other, before finally folding them down upon each other. This little action, the object of which is a mystery, is performed with a grace which goes well with its elegant contour and colouring.

At noon the blue sky became overcast, and a cold wind from the north sprang up, bringing with it a heavy and prolonged shower. For a time I stood under the trees; then the rain cleared away and the sun appeared, but the fresh northerly breeze continued. While watching the splendid aerial circling of a pair of Harriers (*Circus gouldi*) at a great height, I became conscious of a couple of smaller birds below them, but still at a considerable altitude; these latter were also circling, but were gradually passing away to the south, or inland. Presently others were noticed going south in the same fashion, and I saw that they were Wood-Swallows (*Artamus sordidus*), which were arriving from the mainland with a fair wind. Many kept at a considerable height, others came down into the tree-tops, and presently a pair alighted on a dry branch not far from me. The male, after resting a little, took a skimming flight, and returned with an insect in his bill, alighting near his mate, who opened her beak and fluttered her wings like a fledgeling, when he popped the delicacy into her mouth. The attention was evidently appreciated by his travel-wearied lady. By-and-by the Harriers who had been circling in "the high blue dome" came lower, and one of them made a beautiful gliding flight towards the beach, in the

teeth of the wind, as if propelled by invisible power, for the wings were practically motionless. Perhaps the "flight-men" can explain how it is done, for to an onlooker it is difficult to see whence comes the motive power against a high wind.

The delicate "Pick-it-up" call of the Tree Diamond-Bird or Pardalote (*Pardalotus punctatus*) was another sound which greeted the ear on this spring day. One of the smallest of our migrants, its voice is usually first heard during the last week of August or the first few days of September. The Pipit (*Anthus australis*), too, is an early September arrival, and this year a party of these brown "Ground-Larks" was actually seen to arrive from over the water at 7 o'clock on the morning of 8th September. They were evidently much wearied, as the breeze was southerly, and against them, and they flew as closely as possible to the surface of the sea. It is interesting to have this piece of confirmatory evidence as to the migration of the little Pipit, which appears so averse, when here, to any but the very shortest flights.

Forgotten Feathers.

BY H. STUART DOVE, WEST DEVONPORT (TAS.)

IN looking through some old cuttings recently, I came across extracts from a letter by Capt. Baudin, of the French expedition sent out by Napoleon in 1800, with reference to his explorations of Bruni Island, Frederick Henry Bay, Maria Island, and the Schoutens. In this letter occur many notes on Tasmanian birds. The Black Swan, Pelican, Albatross, and Cormorant were seen in numbers; the Sandpiper ("*la Becassine*") was noted on the seashore, also the Pied Oyster-catcher ("*la pie de mer a pieds et bec rouge*"). We are in doubt as to what was meant by "*goneland gris*," but probably the large Pacific Gull in immature (grey) plumage, one of the most frequent birds on our beaches. The sailors thought highly of the Black Swan for the cooking pot, and took unfair advantage of that noble bird in the moulting season, "when it can only fly with difficulty, and when it can be captured while swimming, notwithstanding that it can acquit itself well even then. The Duck and Teal are, after the Swan, the birds whose flesh makes the best eating. The Cormorant and the Albatross, although less good, are not for that reason to be disregarded." (The French cooks must have exercised their art to some purpose in making these two species palatable!) "The Oyster-catcher, Boobie, and Gulls are scarcely worth catching."

Capt. Baudin also refers to some of the land-birds which he saw on the islands of D'Entrecasteaux Channel and upon the mainland of our island. "The commonest species are the Parrots, blue-breasted and yellow-breasted, and another kind with red wings and green plumage. The latter is much smaller than the former, which is as large as a Dove, and very beautiful." The voyagers

also observed the Eagle, the Hawk, the Cuckoo, "*la Pigneche*," "*la Grieve*," "*la Perdix*," Quail, and other kinds. Here, except with the Magpie, we can only speculate as to the species referred to; probably "*le Coucou*" was the large Pallid species, and the Quail the Brown, which is plentiful on some of the islands. "*Criesche*" is an old French word meaning "speckled," so "*la Pigneche*" may have been one of the Rails. The "beautiful golden-winged Pigeon," of which a specimen was obtained, was unquestionably the Bronze-wing (*Phaps chalcoptera*). "*La Grieve*" in all probability refers to the Shrike-Thrush (*Collyriocincla rectirostris*), which "thrusts itself upon the notice by its bold approach and rich whistling notes," while I should say that the "speckled one" may very well have been the Spotted Ground-Bird (*Cinclosoma punctatum*), not at all uncommon now, and probably very plentiful at the time the observant Baudin visited our shores.

The Jungle and the Snows.

BY ROBERT HALL, C.M.B.O.U.

THE following should be read in conjunction with tables A to E of the paper printed in our last issue, pp. 109-117:—

APPROXIMATE DISTRIBUTION OF SIMLA HILLS PHEASANTS.

- Table A.—Monals.—(1) Common Monal (*Lophophorus refulgens*)—East Afghanistan to W. Bhotan.
(2) Chamba or Impeyan Pheasant (*L. impeyanus*)—Chamba, N.W. Himalaya.
(3) De Huys's Monal (*L. d'huysii*)—West Sze-chun, in West China, to East Koko-nor.
(4) Sclater's Monal (*L. sclateri*)—E. and S.E. of Sadya, N.E. Assam.

Table B.—White-crested Kalij—Hazara to Nepal.

Table C.—Common Koklas—Chamba to Kumaon.

Table D.—Chir or Cheer—Chamba to Nepal.

Table E.—Western Horned Tragopan—Higher ranges of Cashmere to Gurhwal.

As representatives of these five genera are all to be found along the Hindustani-Tibet road of the Simla Hill States, the localities in which they may be found are tabulated. Varying as they do in the character of their food, the localities naturally vary botanically. It is these plant differences that help to indicate the habitats of the species, so the common foods are also shown. The characters of flight as the birds leave the ground are so different as to warrant their being listed as an aid to identifying the birds on sight. It is quite possible, by means of this table, that all the Pheasants of the Simla Hills could be identified without the use of a gun. This is the intention.

Pheasants are frequenters of the outer hills, while the Snowcocks frequent the inner and drier hills not touched by the monsoon. Most of these beautiful birds are known to the people of our States through the medium of the zoological gardens, so that our interest is a living one.

Species.	Habitation.	Call.	Flight.	Food.
A. — Common Monal (<i>Lophophorus refulgens</i>).	Forest of higher altitude.	Loud plaintive or shrill screeching whistle.	Shoots out horizontally from hillside, then dropping like a stone with closed wings.	Grubs in decayed leaves (autumn), roots, berries (other seasons)
B. — White-crested Kallj (<i>Euplocamus albicristatus</i>).	Wooded ravines in every kind of forest of lower altitude with abundant rainfall.	Loud whistling chirrup.	Down the khad, running up hill.	Grubs, roots, seeds, and sprouts.
C. — Common Koklas (<i>Pucrasia macrolopha</i>).	Mixed oak forest, from crest to halfway down.	"Kokkok koklas."	With cover lies close; with dogs flies into a tree; more rarely rapid flight down-hill.	Principally buds and leaves.
D. — Chir or Cheer (<i>Catantus wallachi</i>).	Little grassy cliffs in precipitous places.	A few loud screeches on getting up.	Incredible speed down hill, with closed wings, guided by tail.	Roots and grubs, neither buds nor leaves.
E. — Western Horned Tragopan ("Argus") (<i>Cerionis melanocephalus</i>).	Varying forest localities having shelter from sun.	Unlike other Pheasants, almost mute, or single note — "Waa."	Running on ground, not rising.	Feeds on leaves in trees and shrubs, principally oak and ringal.

Summer Visitors.—Most of our summer visitors have arrived. The Fan-tailed Cuckoo began trilling on 24th August; the Tree Pardalote called on 26th; the Welcome Swallows were here on 27th; and several Pipits were seen during that week. The Bronze-Cuckoo was first heard on 1st September.—H. STUART DOVE.
West Devonport, Tas., 3/9/18.

Stray Feathers.

Rare Birds.—One Painted Snipe was seen on the Purrumbete estate, Camperdown, early in November, and a pair on Marida Yallock estate, near Terang; also a Little Bittern (very rare here) at Forest Park, Naroghid, the first noticed for over twenty years.—L. BUCKLAND. Camperdown, Vic., 25/11/18.

* * *

Bustard and Mice.—During the mouse plague here I shot a large Australian Bustard or Plain-Turkey (*Choriotis australis*). When cleaning it I found it had two complete Quail in perfect condition, and the hair from innumerable mice which it must have devoured. The Quail were in immense numbers about the same time as the mouse plague. On one occasion I flushed a bird from its nest, which contained eleven eggs.—ARTHUR C. BLIGH. Condamine Plains, Brookstead (Q.), 11/11/18.

* * *

Lyre-Bird's Nest.—The Lyre-Bird (*Menura victoriæ*), fortunately, has not yet been killed out by foxes, for I had the pleasure of listening to four male birds lately at Porepunkah; also, a few days ago I saw a nest on the side of the cutting near Eurobin Falls. The coach to Mount Buffalo passes within a few feet of the nest, and yet the sitting bird was not disturbed. This shows that this bird is not as shy at times as it is made out to be. It is one of the earliest nesting birds we have, and begins to sit about the middle of July.—THOMAS BELL. Porepunkah (Vic.)

* * *

A Dance of Coots.—Mr. L. W. Thruston, of Devonport, tells me that when at Campbelltown, in the Tasmanian midlands, he surprised, among the tall tussocks at the edge of a swamp, a party of Bald-Coots (*Porphyrio melanonotus*), which were apparently occupied with some kind of social gathering or dance. Four of them were standing together, with the wings half-elevated, and one of these had its foot partly raised as if about to strike it on the ground. About half a dozen others were standing round looking on. He had a few seconds to observe them before they saw him, when the party immediately dissolved. The incident was forcibly recalled to his mind recently when looking through Hudson's "Naturalist in La Plata" by the illustration in that volume of the dance of Jacanas.—H. STUART DOVE, F.Z.S. West Devonport, Tas.

* * *

An Extraordinary Accident.—A mishap of a most unusual and curious character befel Mr. Howard Dimmock, of Glendonbrook, on Thursday evening, 24th October. He was coming into town (says the *Singleton Argus*) in his motor-car early in the evening,

and when near the Glendon bridge some object struck his wind screen, smashing the thick glass to fragments. Pieces of the glass wounded Mr. Dimmock in three places on the face, narrowly missing his eyes, but fortunately he stuck to his steering wheel. On arrival in town he was streaming with blood, and his three wounds had to be stitched, while a piece of glass was extracted from his face. On examining the car the dead body of a Jackass was found in the vehicle. Its head and back were broken, showing that it had had a head-on collision. The car was travelling at a fair speed at the time, and Mr. Dimmock was very lucky in not being much more seriously injured by the flying glass. It was "bad for a coo" when she met a railway train, and the Kookaburra found it equally bad to get in the way of a motor-car.

* * *

The Gull as a Storm Prophet.—On a beautifully sunny afternoon in mid-May last, a friend and myself noticed a number of Silver Gulls (*Larus novæ-hollandiæ*) going through strange antics in the air over the River Mersey, wheeling in circles at a good height, then diving suddenly towards the water, recovering before touching the surface, and ascending to repeat the performance. Two days afterwards a spell of rough weather set in, with north-west squalls and rain. Again, on the afternoon of 25th September, which was equally fine, with fresh north-west breeze, the Silver Gulls were seen at the same aerial gambols, which were followed within 48 hours by a strong disturbance, with thunder, north-west squalls, and heavy showers. There is no doubt that the birds felt these atmospheric disturbances approaching long before they were perceptible to us, and were impelled to unusual action thereby, in the same way that the domestic cat will sometimes go "fey" twenty-four hours or even more before a cyclonic disturbance, and tear about the rooms and in and out of the house like a mad thing.—H. STUART DOVE, F.Z.S. West Devonport, Tasmania, 31/10/18.

* * *

Pajingo Notes.—I once saw a Wedge-tailed Eagle swoop down and grab a very big tom-cat, gone wild. The Eagle carried the cat up about 30 feet, then let it drop—whether to kill it that way or because it could not hold it longer I cannot say. The Eagle at once swooped down again, but the cat cleverly evaded its talons, and before he could rise and make his third swoop effective the cat reached safety in some bushes, and the Eagle, with a defiant flight round our heads, flew away. With Eagles and Crows my theory is they do an immense deal of good in their natural state, but when they become rogues, and find lambs are good, these particular Eagles become a pest, and those Crows that come about homesteads and steal the fowls' food, and chickens when available, give up searching for their natural food,

and sooner or later have to be destroyed. The same applies to that charming and interesting mimic and all-round clever clown, the Queensland Bower-Bird (*Chlamydera orientalis*), which is often seen here. I like to hear them making all sorts of queer noises and see them doing a fighting strut with their crest up, but occasionally one of them becomes destructive, not allowing a tomato, peach, or other fruit to ripen—just pulls off the lot, and throws them down; but this does not often happen. I have had a few sad days when a noted bad character has disappeared during my absence, and also noted the contented and too-innocent face of the gardener.

Our summer birds are back again. We look every October for the Bee-eaters (*Merops ornatus*) and Dollar-Birds (*Eurystomus australis*), and it is a marvel ever new how the little Native-Hen (*Gallinula tenebrosa*) appears early in November, with the very first thunderstorm. (Where do they winter?) One night last week a flight of these birds flew over our house, and one hit the roof and scrambled about for a time. Next morning a little Hen was fluttering about the lawn and garden, eating bits of pig-weed, and quite at home. The next morning it was gone, and one wonders if it knew where to follow on and find its late companions.

We are having a bad time—no rain of use since last March—and the water-holes are giving out fast. The Cormorants are having a great time among the dying fish. I notice that stockmen always call them "foul birds that pollute water-holes," but forget the dead fish would also do that if the Shags did not help to get rid of them. Bush fires have been dreadful this year also.—J. BLACK (MRS. A. BLACK). Pajingo Station, *via* Charters Towers, Queensland.

* * *

Some Gilgi Notes.—We have had the Painted Quail (*Turnix varia*) on the plains in these parts in millions, but the cold, combined with the extremely dry weather, has cleared most of them away. I witnessed a tragedy lately, while catching a horse in the yards. A Painted Quail whizzed past me, and, making straight for the house, went bang against the wall. I have seen them strike wire and rail fences, but one would naturally expect them to steer clear of a house. We have had no rain for six months, and the Condamine River is dry, and the bird masons are hard put to it to provide nesting homes for the season, such as the Magpie-Lark (*Grallina picata*), Grey Jumper (*Struthidea cinerea*), Tree-Martin (*Petrochelidon nigricans*), and the Swallow (*Hirundo neoxena*); so I allowed my windmill tank to overflow to provide the necessary moisture for the mud, and also provide water for the Magpies (*Gymnorhina tibicen*), Laughing Kingfisher (*Dacelo gigas*), &c. The above birds never seem to leave us. Our Swallows disappeared for six weeks, but returned two weeks ago, and are now patching up their old nest, which they always seem

to do in preference to building a new one. Yesterday I noticed a pair of Grey Jumpers busy building, but the Magpie-Larks have not started yet; these birds are usually the first to begin nesting, and I have never seen them with young at the end of May, but in June and July they all appear to have their young ones. The dry season may account for the delay this year. A pair built their nest last year a few feet under the nest of a Crow, and apparently were not disturbed by this bird; possibly the Crows were a protection from other birds, but I do not know why the young birds were not eaten by the Crows, as I saw one pick a Magpie-Lark off a post one day and go off with it; however, this is unusual, and I think the bird must have been driven by hunger. Also, one killed a pet Scaly-breasted Lorikeet (*Psittenteles chlorolepidotus*) one day last week. The little bird fell out of its nesting hollow in a tree in the garden. I was rearing him until he could fly. He was fed two or three times a day by his parents, and we gave him extra rations in the shape of a spoonful of honey. He was getting on very well, and was placed on the branch of a tree every morning, and I noticed that when fed by the parents he sat up and vigorously flapped his wings. The parents probably had to go to some scrub country about ten miles away for their food, as no trees are flowering here. They first fed their young at from 8.30 to 9 a.m., then again at mid-day, and lastly towards evening—never more than three times daily.

During the mating season I have noticed that the males of the Australian Bustard or Plain-Turkey (*Eupodotis australis*) disport themselves exactly as the tame species do by fanning their tails, outstretching their wings, and lowering the skin of their breasts almost to the ground. I noticed a pair fighting lately, and after a vicious bout they would circle round one another with their plumes extended, making a peculiar noise at the same time.

I found a Freckled Frogmouth (*Podargus phalaenoides*) nesting lately. I think these birds account for many of the young birds in the nests about here, but of that I am not certain. The Magpies suffer very much, and I have known those that live about the house to build two or three nests in the season without result; another time they might rear two clutches. Last year three of our pet Magpies had two nests, and the male bird had charge of both nests: anyway, he fed the young of both, almost 100 yards apart. The birds have had a royal time for months with the mice, and will miss them when they disappear; they are not so plentiful now, and seem to be on the move. A strange and fortunate circumstance connected with this plague is the absence of any young.

I am feeding some cattle from a couple of haystacks, and, of course, Magpies are plentiful, with a pair of Crows (*Corvus coronoides*) and a Whistling-Eagle (*Haliastur sphenurus*) hard by. It is amusing to watch the antics of the birds. Evidently the Magpies do the hunting, but as soon as a Crow sees that his



The Brown Hawk.

PHOTO. BY W. H. D. LE SOUEF, C.M.Z.S.



Spine-bill Honey-eater.

PHOTO. BY A. JONES, KANGAROO GROUNDS.

friend has a mouse he sets off after the Magpie, and before many minutes have elapsed the mouse drops to the ground, to be immediately taken up by the Crow. In turn the Eagle, being near all the time, sets off after the Crow, and in a very short time he drops his prey, which is cleverly caught in mid-air by the Eagle, who then retires to a convenient post to enjoy his mouse. I notice also that if the Magpie comes in my direction his pursuers do not follow him. I observe scores of these birds out on the plains right into the middle of the nesting season which have apparently no parental cares. I see them coming to their haunts in the early morning and returning in the dusk; but then the drought which we are passing through might account for that. We are having one of the coldest and driest winters on record, and milk was frozen solid in the house on Thursday night. It is nothing to get three weeks on end of frost.—E. R. CALDWELL. Gilgi, Pampas, Queensland, 20/9/18.

Camera Craft Notes.

The Brown Hawk.—The following important note from Mr. Tom Carter was too late to be included with the article published in the last number of *The Emu* on "Food of the Diurnal Birds of Prey." He states that on 21st January, 1916, he shot a Brown Hawk (*Hieracidea occidentalis*) in South-West Australia, which he suspected of evil intentions, as it was perched in a tree above a lot of feeding poultry. On examining the bird he found that its crop was packed full of large caterpillars and grubs. This shows that this particular Hawk is evidently of far more value to the farming community than it is generally given credit for. It is probably one of our commonest Hawks.—W. H. D. LE SOUËF.

* * *

The Spinebill (*Acanthorhynchus tenuirostris*).—One of the most beautiful-liveried of our southern Honey-eaters, the Spinebill has been aptly named on account of its spine-like beak, which is eminently adapted to sip the deep-seated nectar situate in long, cylindrical, bell-like flowers and pendulous blossoms, because of its long, slender, and somewhat recurrent structure. It is indeed a fascinating sight to observe a pair of Spinebills fluttering and hovering in front of a bunch of wild-flowers which are to be found growing on a shrub. It is truly marvellous how the bird can drink in the honeyed contents with the aid of its brush-like tongue whilst suspended in mid-air in this manner, uttering meanwhile its shrill but musical note. It is thus able, whilst on flight, to obtain the delectable contents of those flowers that are otherwise inaccessible to it, especially those that would break off owing to their fragility if alighted on by the bird when searching for food. These dainty birds exhibit little fear, as a rule, when

approached, and one can readily observe their handsome plumage whilst they are ravishing the flowers for their sweet contents, and at the same time fertilizing them by unconsciously carrying the pollen from one flower to the other. The Spinebill is readily distinguished from other Honey-eaters by its white, brown, and black appearance, its ruby-coloured eye, and its distinctive long, slender bill. This dapper bird acts as a foster-parent to the large Pallid Cuckoo, and it is quite an interesting sight to watch the foster-parent feeding the young Cuckoo, which is much larger than the nest when it is old enough to fly. The nourishing of the Cuckoo is accomplished by the Spinebill by perching on the back of its foster-child, which opens its mouth, doubles back its head, and receives the proffered morsel, consisting of various insects.—A. MATTINGLEY.

Correspondence.

To the Editors of the "The Emu,"

DEAR SIRs,—Will you allow me to reply to Mr. W. T. Foster's remarks *re* "Cormorants: Are They Pests or Otherwise?" which appeared in the last issue of *The Emu*, and in which he criticises my research work. Firstly, I would point out that any research work must be carried out in a scientific manner, otherwise it is of little use. All dates, localities, and so on must be verified, otherwise no reliance can be put upon statements or suppositions. Secondly, Mr. Foster says I examined seventeen specimens, all from the one locality. If he follows up my work he will see I have examined over 60 stomachs, covering the greater part of the year, and from many localities. Your contributor then proceeds to show that I must be wrong, because he saw a fish in a Cormorant's throat 46 years ago, when quite a lad; this is only one bird, and he did not examine the stomach. It is hardly a scientific argument to rely upon one's memory when a boy in 1862. I would further state that a great deal of research work carried out on most scientific lines by my esteemed friend Dr. A. M. Morgan bears me out on all points raised. Many of the specimens taken and dissected by me were taken close to well-known fishing grounds—in fact, in some instances fishermen were catching whiting at the time, yet not one was found in the stomachs of the birds. As for seeing Cormorants swallowing fish, this cannot be taken as evidence, for Mr. Foster did not examine any of their stomach contents, and, as to the species of the fish, it is a mere supposition. I am surprised that your contributor's long years of experience have not shown him that the Cormorant can more easily catch the slow-swimming fish, and thus nature's balance is preserved. It is destructive man who upsets the balance, and blames the unfortunate birds for it. In the opening lines of Mr. Foster's article he says "and perhaps throw some

additional light on the subject of the dietary of the Cormorant." This I consider he has not done, for he has not dissected one single stomach, and relies upon his memory of 1862 for evidence of having seen a single Cormorant with a fish which it could not swallow, and this he admits must have been imprisoned in a pool far from the deep sea.—Yours, &c.,

S. A. WHITE.

To the Editors of "The Emu."

SIRS,—In the October number of *The Emu* appears an article by Mr. W. T. Forster criticising Capt. White's conclusions as to the food of Cormorants. As I have been associated with Capt. White in this work, I hope you will allow me to make a few remarks on the subject. Mr. Forster rightly states that it is "unsafe to generalize from a single case," and yet forms his opinion on *one* observation made more than fifty years ago. The incidents he mentions, of seeing Cormorants diving in water known to contain fish, are not observations—they are pure suppositions, for there is no proof that the birds were capturing marketable fish, or even any fish at all. It is on so-called observations such as these that the Cormorants are condemned by so many people. Capt. White does not "generalize from a single case." We have now dissected and carefully examined the stomach contents of over 60 Cormorants taken from five different localities—all good fishing grounds, and not from localities where marketable fish were scarce, as Mr. Forster, without any evidence whatever, supposes to be the case. Of course, Mr. Forster is mistaken in stating that Cormorants devour their food under water. Neither Cormorants or any other birds, except Penguins, are able to do this; they are obliged to come to the surface to swallow even the smallest fish. Neither Capt. White nor anyone of ordinary intelligence suggests that Cormorants consciously discriminate between marketable and unmarketable fish; but we do contend that they discriminate between those fish which are easily caught and those which are not. The former consist of slow-swimming fish, which depend more upon their harmony with their surroundings than upon their swiftness for their safety, and it is for this reason that Cormorants fish almost invariably over weedy bottoms, where such fish are found. Very few of such fish are of marketable kinds; the only exception I know of is a fish called locally the rock flathead, which lives on weedy bottoms. It is probably an edible fish, but does not come into the market because the fishermen do not find it worth their while to fish in such places. It is not the same as the sand flathead (*Platycephalus fuscus*), an example of which we have not yet found in a Cormorant's stomach. Cormorants do occasionally catch edible fish, for last year, in the mud under a Cormorants' rookery at Port Broughton, I found one garfish among hundreds of thousands of disgorged fish. At

the very time that I was examining this rookery a party of fishermen caught ten dozen whiting less than a mile away; yet in the rookery there was not a single whiting to be found.—Yours, &c.,

A. M. MORGAN.

46 North-terrace, Adelaide, 11/12/18.

RE-NAMING AUSTRALIAN BIRDS.

To the Editors of "The Emu."

SIRS,—Regarding the debate on the above-mentioned subject at the conversazione of the R.A.O.U., as recorded in *The Emu*, ante, pp. 144–147, may I presume on your courtesy for a brief rejoinder?

I had hoped to keep the controversy out of this journal by printing my address at my own expense and distributing it privately, leaving my opponents to follow suit, if they thought fit.

Although my address occupied the greater part of the evening, it has been modestly mentioned in less space than you have allotted to each of my opponents and to the chairman's "summing up," leaving readers to infer that I had no case. "No desire was expressed" for a vote, because it was then of little value to either side.

At the opening of my address, and subsequently, I put particular stress on re-naming Australian *endemic* birds. Unfortunately, Mr. Alexander took for his illustrations generic names of *cosmopolitan* birds that he thought required alteration—to wit, *Phalacrocorax* (Cormorants) and *Fregata aquila* (Frigate-Bird). For these the compilers of the R.A.O.U. "Check-list" followed the classification and nomenclature in the British Museum's "Catalogue of Birds," vol. xxvi. Mr. W. R. Ogilvie-Grant dealt with the genera and nomenclature. In the preface to the volume the Director, the late Sir W. H. Flower, F.R.S., certifies:—"The 'Catalogue' is based, not only upon the immense collection of birds in the Museum, but also upon all other available material contained in public or private collections or described in zoological literature. It therefore professes to be a complete list of every bird known at the time of the publication of the volume treating of the group to which it belongs. Under the heading of each species is a copious synonymy, references being given to every mention of it which occurs in standard books or journals. This has been a work of prodigious labour, but it is hoped that, being fairly exhaustive, it has been done once for all, as far as existing literature is concerned." Does Mr. Alexander place his opinion before that expressed by the deceased *savant*, and infer that the nomenclature of an official and classic work is incorrect?

My other opponent, Mr. Mattingley, took very high ground—in fact, so high that it was out of the realm of practical or popular

ornithology. He referred to "the strongest feature of the International Code is what is known as the law of priority," but I took great pains in my address to show that the International Code departed from the original agreement and definition of the arbitrary "law of priority." *This must not be lost sight of.*

Dr. Leach (chairman), in concluding the discussion, states:—"We could not use a different family here" (than elsewhere). The question of "families" of birds was not raised by me. "Over twenty Australian generic names had been finalized" by the International Commission. Dr. Leach might have further added that "the majority were on the present R.A.O.U. 'Check-list,' and among those Mr. Campbell had always contended for." Possibly more Australian names may be "finalized" if proper representation were made to the International Commission.

To conclude with my "profitless propaganda"—an expression, so far as I recollect, not used at the discussion. The "profitless propaganda" has brought me many unsolicited and helpful letters. The following are extracts:—

One from a world-renowned scientist at Washington, U.S.A.:—"What we need, after this war is over, is a world ornithological congress to settle the question once and for all. As to how such a congress could untangle this entire matter is a question I propose to discuss very shortly in the public press. I will not touch upon it here. 'More power to you!'"

From another distinguished American in California:—"Your remarks are in keeping with the motto on the title-page of the A.O.U. 'Check-list': 'Zoological nomenclature is a means, not an end, of zoological science.' I have adhered to the current rules of zoological nomenclature. Such a course involves changes in nomenclature that are certainly embarrassing to the general writer on ornithology and other writers that have occasion to refer to technical bird-names, and *leads to further instability*, which, I believe, is the hope of the future. When the instability reaches the stage of a general nuisance the remedy can be found in the fiat. An international commission, guided by such evidence as the R.A.O.U., B.O.U., and A.O.U. lists, &c., could frame lists of names in each group of animals, and arbitrarily make these lists the starting-point in nomenclature. If the future revealed duplication of names, it would be the province of the commission to supply the deficiency by coining new names, letting 'the dead past bury its dead.'"

From a Cambridge ornithologist (England):—"Little is known of the so-called 'International Code.' Probably the reason of the neglect is that our 'head men' in zoology won't hear of it, and are not on it. I can't say how developments may go. Ornithologists pay no attention, either, because they stick to the Stricklandian Code, or have 'gone German.' Try to keep some reasonable balance, as in the B.O.U. list."

And, lastly, one of several I have received from nearer home. A well-known doctor in New South Wales writes:—"Many thanks

for sending me a copy of your address on nomenclature. I see 'eye to eye' with you, and agree with every word you say. I congratulate you on coming out into the open and fighting against those who are carrying nomenclature to an absurdity with their slavish adherence to the fossilized 'law of priority,' and I agree with you that the cumbrous present-day system of nomenclature, with its numerous trinomial names and its unnecessary multiplication of species has done more to depopularize the study of ornithology than anything else. I hope, with you, that the R.A.O.U. will continue to retain the old Gouldian names, which are almost household names, and will not be drawn into the battle of names."

—I am, &c.,

A. J. CAMPBELL.

Surrey Hills, Victoria, 22/11/18.

WHAT ARE AUSTRALIAN SEAS ?

To the Editors of "The Emu."

DEAR SIRs,—As you remark in your comments, Mr. Mathews's article in *The Emu* (vol. xviii., p. 83, October, 1918), entitled "What are Australian Petrels?" is very suggestive, and I hope you can find space for the following reflections and remarks on the subject.

The obvious answer to Mr. Mathews's question is that Australian Petrels are species which occur on the Australian continent and the islands adjacent thereto and in Australian seas. It might have been supposed that some definition of these areas would have been given by those who have prepared lists of Australian birds, but, at all events in the two most recent lists—viz., the R.A.O.U. "Check-list," 1913, and Mathews's "List," 1913—no definition of the area regarded as "Australian" is given. Both these lists include the birds found in the Commonwealth—i.e., Australia and Tasmania and the islands lying close to the coast—and exclude those of the dependencies of Papua, Norfolk Island, Lord Howe Island, and Macquarie Island, so that no difficulty arises as to Australian land-birds. With regard to sea-birds, however, the case is quite different, and before we can answer Mr. Mathews's question as to "What are Australian Petrels?" we must agree as to "What are Australian Seas?"

It is well known that, according to international law, a country is regarded as owning the seas within three miles of its coast. In the case of bays and gulfs, a line is drawn from one headland to the other, and the water enclosed thereby is regarded as territorial. There can be no doubt that we are entitled to regard any Petrels found within these limits as Australian Petrels. In this category we have those species which breed on the mainland or islands off the coast, and those seen or obtained on the coast or in territorial waters. The chief areas of territorial waters on the coast of Australia are Port Phillip, Western Port, and Corner

Inlet, in Victoria; Gulf St. Vincent and Spencer Gulf, in South Australia; Sharks Bay, Exmouth Gulf, King Sound, and Cambridge Gulf, in Western Australia; together with Bass Strait



(between Victoria and Tasmania), Investigator Strait (between South Australia and Kangaroo Island), Van Diemen Gulf (between the Northern Territory and Melville Island), and the seas between the coast of Queensland and the Great Barrier Reef. I take it that birds found in these areas can unquestionably be regarded as Australian.

In the past, however, the term "Australian seas" has been used to cover a much wider though indefinite area, and probably most Australian ornithologists would consider that it should not be restricted to territorial waters. If I am correct in thinking this, it seems highly desirable that we should agree as to the area we intend to include. Four alternatives occur to me—(1) the first is to extend our limits to include the region within sight of the coast—say 30 or 40 miles; (2) the second is to include all seas within straight lines drawn from one point on the coast of the mainland or Tasmania to any other point (this would enable us to include the Great Australian Bight and the Gulf of Carpentaria as Australian seas); (3) the third is to select some arbitrary distance such as 100 or 500 miles from the coast as our limit; (4) the fourth is to count all seas nearer to Australia than to any other land. It would also be possible to combine numbers 1 and 2 or numbers 2 and 3. Suggestions 1 and 3 have the advantage of including an equal amount of sea off all parts of the coast, whilst in the case of numbers 2 and 4 the areas of sea regarded as Australian would be much greater off some parts of the coast than it would be off other regions.

In the accompanying map (No. 1) I have indicated territorial waters by shading, and have included not only undoubted territorial waters but also areas lying between islands and the mainland, to which it is doubtful if this term properly applies. I have also drawn lines direct between the most outstanding points on the coast, in accordance with suggestion 2. It will be seen that in the Bight a point 500 miles from land would be included, whilst on the east and west coasts the additional area included is only small.

In considering suggestion 3, it is worth bearing in mind that, since Torres Strait is only about 100 miles broad, if we fix our line more than 50 miles from the coast we shall include waters which must be regarded as Papuan rather than Australian.

In map No. 2 I have indicated the area that would be included under suggestion 4—that is, all seas nearer to Australia than to any other land. The area is so large that it is impossible to draw such a map to scale without distortion of familiar outlines, and the coast-line of the Antarctic continent is relatively too large. The dotted line passes half-way between the Australian coast and the nearest lands, which are, in order, New Guinea, the Louisiade Archipelago, the Avon Islands, Lord Howe Island, New Zealand, Macquarie Island, Antarctica, St. Paul and Amsterdam Islands, the Cocos-Keeling Islands, Christmas Island, Sumba, Rotti, Timor, Timorlaut, the Aru Islands, and back to New Guinea. It

will be seen that the boundary of the area included by this line is narrowest in Torres Strait, where it is only 50 miles from the coast, and widest off Cape Leeuwin, where it is probably at least 1,500 miles away. Between these points the breadth of sea included increases fairly regularly, being broader on the south and west than in the north and east.

I raised this question at the annual general meeting of the R.A.O.U., and those present seemed inclined to agree with me that the fourth suggestion was the most satisfactory. Under this suggestion we may define "Australian seas" as "all those portions of the ocean nearer to Australia and Tasmania than to any other country." If this definition is agreed upon we shall be in a position to discuss the validity of records of the occurrence of various Petrels in "Australian seas," but without a definition of this term discussion would be profitless.

There are other points arising out of Mr. Mathews's article that I should like to discuss, but as I fear you will be unable to find space for a longer letter I will defer them to a future occasion.

W. B. ALEXANDER.

Queen's College, Melbourne, 5/12/18.

Additions to the Library.

BY W. B. ALEXANDER, M.A., HON. LIBRARIAN.

DONATIONS.

- "The Food of Australian Birds." New South Wales Department of Agriculture Science Bulletin No. 15.
"Some Considerations on Sight in Birds." J. C. Lewis.
(Reprinted from the Smithsonian Report for 1916.)
"Tasmanian Field Naturalists' Club: Easter Camp-Out, 1918."
"Birds from Pauai and Mount Pulog, Sub-Province of Benguet, Luzon." R. C. M'Gregor, Bureau of Science, Manila.
"Flinders Chase: a Reserve for Fauna and Flora." S. A. White.
"Ooldea, on the East-West Railway; On the Flooded Murray River; and Other Sketches." S. A. White.

EXCHANGES.

- Victorian Naturalist*, vol. xxxv., part 4.
British Birds, vol. xii., parts 1 and 3.
University of California Publications in Zoology, vol. xvii., part 18;
vol. xviii., parts 15 and 16.
Hawkesbury Agricultural College Journal, vol. xv., part 9.
Ibis, vol. vi., part 3.
Auk, vol. xxxv., part 3.
Proceedings of the Linnean Society of New South Wales, vol. xliii.,
part 2.
Condor, vol. xx., part 4.

Avicultural Magazine, vol. ix., part 9.

Proceedings of the Academy of Natural Sciences of Philadelphia, vol. lxix., part 2.

Proceedings of the California Academy of Sciences, vol. ii., parts II and 12; vol. vii., parts 10 and 11.

Austral Avian Record, vol. iii., part 6.

South Australian Ornithologist, vol. iii., part 8.

ARTICLES IN FOREGOING PUBLICATIONS ON AUSTRALASIAN BIRDS.

"Australian Parrots," by the Marquis of Tavistock. *Ibis*, vol. vi., part 3, p. 519.

An interesting letter stating differences noted in captivity between the sexes of Australian Parrots. The author differs from Mr. Mathews on a number of points, and suggests that there is room for considerable investigation of the plumage changes and external sexual differences of the Australian Parrots.

"On *Pachycephala melanura*, Gould," by G. M. Mathews. *Austral Avian Record*, vol. iii., part 6, p. 134.

The author considers that, amongst the sub-species placed as forms of *P. pectoralis* in his "List," three species can be recognized by the differences in coloration of the females. These are *P. melanura*, with two sub-species from Mid and North-West Australia; *P. robusta*, with five sub-species from North-West Australia, Northern Territory, and North Queensland; and *P. pectoralis*, with seven sub-species covering the coastal regions of the rest of Australia and Tasmania.

"On *Turdus maxillaris*, Latham," by G. M. Mathews. *Austral Avian Record*, vol. iii., part 6, p. 139.

This name was given by Latham to one of the Watling drawings, of which Mr. Mathews gives an accurate coloured reproduction. It has been regarded by Gould and subsequent writers as intended to represent the Fig-Bird, which has hence borne the name *Sphecotheres maxillaris* (Latham). Mr. Mathews gives reasons for rejecting it as indeterminable, and proposes to use *S. vicilloti*, Vigors and Horsfield, as the first name indubitably given to the Fig-Bird. He also considers that *S. stalkerii*, Ingram, was probably obtained in New Guinea, and that the locality—Mount Elliot, North Queensland—is an error. This bird should therefore disappear from the Australian list. It is pointed out that Pycraft, from an examination of the skull, considered the genus *Sphecotheres* should be placed in the *Campephagidae*, and that Milligan has also suggested that it is a member of that family. The author accepts this view of the relationship of the Fig-Birds.

"Ooldea, on the East-West Railway; On the Flooded Murray River; and Other Sketches," by Capt. S. A. White.

This little volume of articles, reprinted from the *Register*, and illustrated with photographs by the author, deals with a variety

of topics. In the first article Capt. White gives an account of three journeys along the Transcontinental Railway, the two latter of which were undertaken with a view to inquiring how far Sparrows had spread westward along the line. Apparently their furthest limit at present is Tarcoola, which they reached in 1917. An account is given of the bird-life in the Ooldea sand-hills and on the eastern edge of the Nullarbor Plains. In the curious underground caves or blow-holes of the latter the familiar White or Delicate Owl nests in some numbers.

The second article deals with Capt. White's trip on the Murray in 1917, of which he has already written an account in *The Emu*. The three other articles deal with "Native Art and Rock Shelters," "Nature in Winter," and "Glories of Spring." In each of them interesting notes on Australian birds appear.

"The Food of Australian Birds." New South Wales Department of Agriculture Science Bulletin No. 15.

This valuable memoir was reviewed in the last issue of *The Emu*.

"Notes upon the Black-breasted Plover (*Zonifer tricolor*, Vieillot)," by S. A. White. *South Australian Ornithologist*, vol. iii., part 8, p. 229.

Capt. White's account of this species is illustrated by excellent photographs of nests and eggs and a bird on the nest.

"Notes upon the Brush Wattle-Bird (*Anthochaera chrysoptera intermedia*)," by J. W. Mellor. *South Australian Ornithologist*, vol. iii., part 8, p. 231.

ARTICLES OF GENERAL ORNITHOLOGICAL INTEREST.

"Some New Facts about Grit," by D. Macintyre. *British Birds*, vol. xii., part 1, p. 2, June, 1918.

"A Review of the Albatrosses, Petrels, and Diving Petrels," by L. M. Loomis. *Proc. California Academy of Sciences*, vol. ii., part 12.

This important monograph was reviewed in the last issue of *The Emu*.

"Some Considerations on Sight in Birds," by J. C. Lewis. Smithsonian Report for 1916.

The Smithsonian Institution at Washington exists "for the increase and diffusion of knowledge among men." One of its methods of diffusing knowledge is by reprinting in its annual report scientific articles of special interest or importance published throughout the world. Our member, Dr. J. C. Lewis, is to be heartily congratulated on the distinction which is implied in the selection of his article on sight in birds for republication. It is probably the first time that an article originally published in *The Emu* has been honoured in this fashion.

"Alfred John North, Ornithologist: an Appreciation," by G. M. Mathews. *Austral Avian Record*, vol. iii., part 6, p. 129.

"Flinders Chase: a Reserve for Fauna and Flora."

This pamphlet gives an account of the movement inaugurated by the Royal Society of South Australia to induce the State Government to set aside the western end of Kangaroo Island as a reserve under the name of Flinders Chase. A committee, consisting of Messrs. S. Dixon, J. M. Black, and S. A. White, has been appointed to conduct a campaign to secure this object. It is proposed to plant suitable trees, introduce members of the Australian fauna threatened with extinction, utilize the native plants and introduced trees, and form a holiday and health resort. Members of the R.A.O.U. will unite in wishing every success to such a laudable endeavour to utilize what is at present an unprofitable area of 1,000 square miles.

Conversazione.

THE October conversazione of the R.A.O.U. was held on Wednesday, 3rd, at the rooms, Temple Court, Collins-street, and there was a good attendance of members, including Mr. J. A. Hill, of Lubeck, and Mr. H. Quiney, of Mortlake. Dr. J. A. Leach occupied the chair.

Mr. A. J. Campbell, on behalf of Mr. H. L. White, tabled an interesting collection of bird skins that had been made by Mr. S. W. Jackson in Central Queensland. A feature of the exhibit was the very excellent series of the Letter-winged Kite, showing all stages, from the nestling to the adult bird. Mr. Campbell said that these specimens had been procured not far distant from where his type clutch of eggs of this species had come from. These skins were accompanied by beautiful sets of eggs sent over by Mr. White to enrich local private collections, and three very handsome sets to be added to the R.A.O.U. collection. Other very interesting skins were those of the Desert Chats (*Ashbyia lovensis*), and a very striking *Malurus* of the *leucopterus* type—undoubtedly a good new sub-species, now named *M. l. diamantina*. Included amongst the skins were specimens of a Raven and Crow, and Mr. Campbell indicated the usual methods of distinguishing between these two birds. Mr. J. A. Hill said that, whilst these birds undoubtedly destroyed much insect life, yet they wrought so much damage amongst the sheep flocks, and in such a cruel manner, that he considered them as being most undesirable vermin. Mr. Quiney attributed his long run of successful fodder crops to his leaving these birds unmolested, whilst his neighbours' occasional failures were probably due to the fact that they persecuted them at every opportunity.

Mr. Mattingley said that the U.S.A. Fisheries Bureau listed Crows amongst the beneficial birds, as at certain times of the year

they visited the sea coasts and accounted for great numbers of star-fishes, which were known to prey upon oysters and whelks.

Mr. Gerald Hill said that he was very pleased to inspect such an interesting exhibit of skins, especially as some of them were very familiar to him. He stated that, whilst it is somewhat difficult to distinguish between Letter-winged and Black-shouldered Kites when at rest, when on the wing it is quite a simple matter.

Mr. Chubb called attention to the fact that the immature Kites were marked as to their sex, and said that in very young birds he had found it impossible to ascertain the sex. He wondered how Mr. Jackson had accomplished the feat. Other members testified as to the same difficulty with young birds.

Extracts were read from South Australian newspapers by the chairman, in which it was stated that Mr. Mathews's collection of bird skins was under offer to the South Australian Museum, and that to enable it to be purchased another £6,000 would have to be found. Several members expressed painful surprise that after the various State Governments had given permission for Mr. Mathews to procure skins of our birds to enable him to produce his work, and also that, as so many valuable skins had been presented to Mr. Mathews by Australian ornithologists, it should be necessary for Australia to buy this collection back again. It seemed possible also that if the money could not be raised the collection would be offered elsewhere. The types, at any rate, of Australian birds should certainly be Australian property, or at least lodged in Australia; yet it seemed possible that, as in the case of the Gouldian collection, they might be lost to us.

It was arranged that Mr. F. E. Wilson should furnish an account of the monthly conversaziones for *The Emu*.

Review.

"JUNGLE PEACE."

[*"Jungle Peace,"* by William Beebe, Curator of Birds, New York Zoological Park, and Director of Tropical Research Station. Illustrated from photographs. New York: Henry Holt and Co. Price, 1.75 dols. net.]

"Of making many books there is no end," but no book made is like Mr. Beebe's *"Jungle Peace."* Mr. Beebe is known to Australians as an eminent ornithologist, and his society subscribes to *The Emu*, but they may not know that he had been an aviator in the Great World War, or that he has such an artistic and convincing way of writing his knowledge and observations gained in the field. Facts, especially nature facts, are often stranger than fiction, and it has not been overstated when a reviewer says Mr. Beebe's style "has a magic which transforms fact." So it is with his field observations in the jungles of British Guiana. The

"Peace Jungle" is especially interesting to Australians, being particularly reminiscent of the great green "scrubs" of tropical Queensland, with trees majestic and massive, some strange and beautiful and some with "lichen-sculptured trunks," springing from the rich red soil, with the verdant roof of interlacing foliage one hundred to two hundred feet overhead; then there are liana loops and tangles in mid-air; palms and ferns below; decorations of tree orchids, white convolvuli, and even red passiflora; lotus-lily lagoons, &c.; and tenanted with creatures in keeping: rare and glorious birds, curious mammals, huge snakes, tree-frogs with "vacuum-cupped toes," ants—stinging ants that attack with "both ends of their anatomy"; singing cicadas and alligators that "roar"; beautiful butterflies, &c.; and there are mentioned "tomatoes no larger than cherries," *Bougainvillea* blooms, fragrant frangipani, coconut palms, and similar introductions, as also seen in northern Australia.

There are, suggestive of the wet season, clouds that "bank up about mid-day, and showers descend with true tropical violence," and a consequent clammy climate that one gets used to. Mr. Beebe not only mentions all these, but more, and takes the reader with him in his outings, whether it be by night in the jungle, full of eerie sounds, or by day along the trail (track) like a tunnel cut through a wilderness of wood. The author has caught the spirit of the scrub, with its peculiar scenes, sounds, and scents, which he so graphically describes. Read the first chapter of "Jungle Peace," and you irresistibly read right on to the end, and fancy you have indeed visited the great "highbush" of Guiana. Hear about Humming-Birds when four cashew trees became inflorescent in a blaze of cerise:—

"The next few days made the trees ever memorable; they were the Mecca of all the Humming-Birds in the jungle. In early morning the air for many yards resounded with a dull droning as of a swarming of giant bees. Standing or sitting under the tree, we could detect the units of this host, and then the individuals forced themselves on our notice. Back and forth the hummers swooped and swung, now poising in front of a mass of blossom and probing deeply among the stamens, now dashing off at a tangent, squeaking or chattering their loudest. The magnitude of the total sound made by these feathered atoms was astounding; piercing squeaks, shrill insect-like tones, and now and then a real song, diminutive trills and warbles as if from a flock of song-birds a long distance away. Combats and encounters were frequent—some mere sparring bouts, while, when two would go at it in earnest, their humming and squeaks and throb of wings were audible above the general noise. . . . Day after day, as we watched this kaleidoscope of vegetable and avian hues, we came to know more intimately the units which formed the mass. There were at least fifteen species, and all had peculiarities of flight and plumage so marked that they soon became recognizable at sight." "Another day," says Mr. Beebe, "I observed closely for an hour, and counted one hundred and forty-six Humming-Birds coming to the tree. During the day at least one thousand must visit it."



Major (Dr.) W. Macgillivray, Tenth President R.A.O.U.

We have read of the "flora of a single tree." Here is the avifauna of a single tree—a tall, slender wild cinnamon tree ("canella" of the natives), which Mr. Beebe observed on the Amazon, and noted in a chapter sandwiched in his Guiana jungle matter. The tree was twiggy and laden with a wonderful harvest of brownish berries:—

"From daybreak to dark the canella tree was seldom deserted. Usually a score or more of birds fluttered and fed amongst its branches. In the few hours I was able to devote to its study I identified seventy-six different kinds, and, together with those which I saw but could not name, I judged that more than a hundred species must have come to the berries during that week in early May. The first day I secured sixteen specimens, all different; and the following day yielded fourteen more, only one of which was a duplicate of the first day's results." (Here follow names and habits of same.)

We congratulate Mr. Beebe on his unique book on nature. We sometimes hear the expression, "the fortunes of war." In the Great War just concluded it was our good fortune to have the United States of America as an ally; therefore we claim Mr. Beebe as one of ourselves. Moreover, he writes in our language and speaks our mother tongue. It is a happy coincidence, too, that this book, with its title, "Peace"—even the "Peace of the Jungle"—should synchronize with the end of the dreadful war.

Royal Australasian Ornithologists' Union.

THE annual meeting of the Union was held at No. 2 Temple Court, Melbourne, on 4th December, 1918, at 7.30 p.m.

There were present:—Col. G. Horne (in the chair), Messrs. W. B. Alexander, A. J. Campbell, R. H. Croll, Z. Gray, H. E. Hurst, W. H. D. Le Souëf, H. W. Ford, A. H. E. Mattingley, F. Keep, G. Hill, A. C. Stone, A. Wilkie, F. Tregellas, J. A. Ross, Dr. B. Nicholls, Miss H. Bowie, Capt. H. L. Cochrane.

ANNUAL REPORT.

The Council has much pleasure in presenting to the members of the Royal Australasian Ornithologists' Union its Eighteenth Annual Report.

Thirty-four of our members are still at the front, and all honour to them! We deeply regret that four—probably five—in addition, have given their lives during the past year, namely:—Reginald Hutchinson, Victoria; A. McKenzie Kirkwood, Victoria; Maurice Thompson, Victoria; R. H. M. Eltis, Victoria; and G. Arnold Young, Queensland (missing for over a year).

At the conclusion of the war an honour board will be erected in the Union's room, so that the names of the brave men who have obeyed their country's call will be handed down to posterity.

Seven members have resigned during the year. Sixteen members

have joined from Victoria, eleven from New South Wales, three from Queensland, three from South Australia, and one each from Western Australia, Tasmania, India, and Norway, making a total of thirty-seven.

The visit to Queensland for the purpose of holding the annual meeting in Brisbane and a camp-out has been again postponed until the war is over. (Arrangements are now being considered for the resumption of the annual congress and camp-out.)

The Union's room at Temple Court, Melbourne, has proved of much service. Two handsome egg-cabinets have been added—one kindly presented by Mr. H. L. White, and the other by Mr. T. G. Austin. The Council is much indebted to both these gentlemen for their generous gifts. Our hon. secretary, Mr. Le Souëf, has also presented a commodious cabinet in which most of the Union's bird-skins are kept; it is, as far as possible, insect-proof. Mr. H. L. White has presented the Union with over three hundred sets of birds' eggs, with full data, and other members have generously given clutches. It is hoped that a full catalogue of the collection will be published in *The Emu* later on, so that our members can see what we still need. Mr. Stone and his helpers have worked well during the year in getting the collection in order. Mr. White has also most generously given the Union twenty-eight of Gould's coloured illustrations, being part of his famous supplement of "Birds of Australia." These are all framed in blackwood, and adorn the Union's room.

The collection of bird-skins is slowly increasing, and Mr. A. J. Campbell, with his two assistants, has got them all in order. Mr. Wm. Howat has kindly presented the Union with a large case of mounted birds, mostly Parrots, for its room.

Mrs. Otway Falkiner, Miss A. J. Fletcher, Mr. Chisholm, Mr. Howe, and others have also presented pictures of interest to the Union.

The conversaziones held at the room on the first Wednesday in every month have been well attended, and many instructive papers have been read, also interesting discussions have taken place; these are usually notified in *The Emu*.

A quarterly meeting is held at the National Museum, through the courtesy of the Director, where members have the privilege of discussing the relationship one species has with another, &c., and also of inspecting Mr. H. L. White's splendid collection and other bird skins.

The Council have again to thank the Royal Zoological and Acclimatization Society for so kindly continuing to house the spare stocks of *The Emu*, &c.

The library continues to increase. The librarian, Mr. W. B. Alexander, has been assiduous in his duties, and his report is appended. The Union's journal, *The Emu*, has been kept well up to its usual standard, despite increased cost, &c., and the papers are of interest and value.

W. H. D. LE SOUËF, *Hon. Sec.*

The following office-bearers were unanimously elected:—
President, A. F. Basset Hull; vice-presidents, Dr. J. A. Leach, Chas. A. Barnard; hon. secretary, W. H. D. Le Souëf; hon. treasurer, Z. Gray; hon. librarian, W. B. Alexander; hon. editor of *Emu*, Dr. J. A. Leach; hon. assistant editor, R. H. Croll; hon. press correspondent, Dr. Brooke Nicholls; hon. auditors, J. Barr, J. Hedding.

Local State Secretaries:—New South Wales, A. S. Le Souëf; South Australia, Capt. S. A. White; Western Australia, W. T. Forster; Tasmania, Clive E. Lord; New Zealand, W. R. B. Oliver; Queensland, A. H. Clisholm; Northern Territory, G. F. Hill.

Members of Council:—Victoria, Gen. C. S. Ryan, C.B., A. H. E. Mattingley, A. C. Stone, F. E. Howe; New South Wales, Dr. J. Burton Cleland, Dr. D'Ombrian; Queensland, Dr. T. Harvey Johnstone, E. M. Cornwall; South Australia, Edwin Ashby, J. W. Mellor; Western Australia, Major A. E. Le Souëf, P. T. Sandland; Tasmania, Robert Hall, H. Stuart Dove.

The following new members had also been elected by the Council during the past year:—

Victoria.—Mr. G. Murray Black, Tarwin Lower; Dr. J. L. Blakie, Surrey Hills; Dr. R. J. Bull, Surrey Hills; Mr. F. Doyle, Melbourne; Mr. Frank Francis, A.I.F., Broadmeadows Camp; Mr. A. MacCaskill, jun., Coleraine; Mr. W. J. O'Neill, Melbourne; Mr. H. Pye, Dookie; Mr. G. M. Quiney, Ascot Vale; Mrs. Ellis Rowan, Upper Macedon; Mr. G. E. Shepherd, Somerville; Mr. H. E. Starke, Malvern; Mr. Hedley Smith, St. Kilda; Sir Baldwin Spencer; Mr. J. M. Thomson, Hawthorn; Mr. H. S. Trevena, Fairfield; Mr. R. Voige, Casterton.

New South Wales.—Mr. Wm. Brennan, Moree; Mr. Neville W. Cayley, Sydney; Mr. T. H. Clee, Moree; Mr. R. G. Hays, Armidale; Mr. A. P. Kemp, Quirindi; Dr. W. J. S. McKay, Sydney; Mr. J. MacPherson, Sydney; Mr. Howard Macfarlane, Bathurst; Mr. F. L. Robin, Sydney; Mr. James Sloane, Mulwala; Miss N. Curwen-Walker, Moree.

Queensland.—Mr. H. J. Kersey; Mr. H. A. Longman, Brisbane; Mr. T. C. Marshall, Brisbane.

South Australia.—Mr. J. N. M'Gilp, Copley; Rev. A. H. Nutting, Port Augusta; Mr. J. H. Welfare, Semaphore.

Western Australia.—Hon. Justice R. B. Burnside, Perth.

Tasmania.—Mr. R. W. Legge, Cullenswood.

India.—Mr. W. A. Tucker, C.P., Sangar.

Norway.—The Librarian, Zoological Museum, Christiania.

The notice by Mr. A. J. Campbell that rule 6 be altered from "seven" to "ten" members, and by Mr. W. B. Alexander that all presidents be *ex-officio* vice-presidents, having been brought up for discussion, were withdrawn for the present, on the hon.

RECEIPTS AND

For Year ended

RECEIPTS.						£	s.	d.	£	s.	d.
To	Balance—General Fund...	...	...	...	...	20	7	9			
"	"	Colour Fund ...	...	...	...	14	5	8			
									34	13	5
"	Subscriptions ...	...	...	...	...	157	5	0			
"	"	Arrears ...	...	...	...	52	5	0			
"	"	Advance ...	...	...	...	14	5	0			
									223	15	0
"	Sales, £5 2s. ; Covers, £1 3s. ; "Check-lists," 12s.	...	...	...	...				6	17	0
"	Donations ...	...	...	...	...				118	8	0
"	Exchange, £1 19s. 9d. ; Interest, £1 8s. 2d.	...	...	...	...				3	7	11
"	Colour Fund—Donations ...	...	...	...	...	60	6	3			
"	"	Advertisement ...	...	...	...	1	0	0			
									61	6	3
"	Trust Fund—Interest ...	...	...	...	...				45	0	0

EXPENDITURE

30th June, 1918.

EXPENDITURE.							
		£	s.	d.	£	s.	d.
By	<i>The Emu</i> , vol. xvii.—Printing, &c.	...	164	6	6		
"	" vol. xvii.—Blocks	...	14	5	2		
"	" vol. xvii.—Coloured Plates	...	33	12	0		
"	" vols. xvi.—xvii.—Patrons	...	1	18	0		
"	Registration Fee, £3 15s. ; Articles, £13 10s.	...				214	1 8
"	Postage, £7 4s. 8d. ; Stationery, £7 11s. 1d. ; Insurance, 5s. 5d. ; Exchange, £2 3s. 1d. ; Commission, £1 7s. 7d. ; Covers, 15s. 1d.	...				17	5 0
"	Room—Cabinets, £85 ; Gas, 10s. 7d. ; Cleaning, 3s. 6d. ; Brass Plates, £1 8s. ; Freight, £1 10s. 1d. ; Sundry, £2 15s. ; Tabs, 3s. 6d. ; Naphthaline, 2s.	...				19	6 11
"	Trust Fund—Rent, £32 10s. ; Binding, £8 2s. 6d. ; Lantern Sheet, £2 5s. ; Cabinets, £1 15s. ; Pictures, 7s. 6d.	...				91	12 8
						45	0 0
"	Balance—General Fund	...	64	1	5	387	6 3
"	" Colour Fund	...	41	19	11		
						106	1 4
						£493	7 7

LIABILITIES

June, 1918

LIABILITIES.							
<i>Nil.</i>							
By Balance	...	...	...	...	...	...	£ s. d. 1,854 18 10
							£1,854 18 10

Audited and found correct.

JAS. BARR, A.C.P.A., }
JAS. HEDDING, } *Hon. Auditors.*

MELBOURNE, 1st October, 1918.

secretary explaining that the Union's hon. solicitors had advised that the notices were irregular.

The balance-sheet and the hon. secretary's report were unanimously adopted.

It was resolved, on Mr. A. J. Campbell's motion, that the annual meeting desires that the Council of the Union should approach the Commonwealth Government and request it to investigate the industry of boiling down Penguins for their oil on Macquarie Island, in case of decrease of its wonderful feathered inhabitants.

A letter was read from Mr. Basset Hull, Sydney, thanking the Union for the honour they had done him in electing him president of the Union for the ensuing year.

A letter was read from Captain S. A. White, Adelaide, stating that the new Act for the further protection of bird-life has been thrown out this session by Parliament, but that it was decided to bring it up again next year, and that there was every chance of its passing.

Much appreciation was expressed at the work that Captain White was carrying on in South Australia, especially by lecturing on behalf of the insectivorous birds of the State, and the way in which he had worked to try and get the new Bird Protection Bill through Parliament.

The chairman, Colonel G. Horne, congratulated the Union on the increase of its membership during the past year and the satisfactory way in which the affairs of the Union had been conducted generally. He considered that the papers published in *The Emu* still maintained their high character and usefulness, and it was largely due to that that the number of members was steadily increasing.

Mr. A. C. Stone read an interesting report on the ringing of Mutton-Birds and White-faced Storm Petrels, and also a report on the egg collection belonging to the Union.

Mr. Alexander read a report on the Union's library, and stated that the first volume of Beebe's "Monograph on the Pheasant" had been received for review in *The Emu* from the publishers, Messrs. Witherby and Co.

The subject of authors' reprints was also discussed.

Mr. Alexander read an instructive article entitled "What are Australian Seas?" illustrating his points with lantern views, and the rather difficult subject was discussed. The balance of opinion seemed in favour of calling all seas that were nearer to the coast of Australia than any other as belonging to this country, and that Petrels and other birds found in those parts could be counted as Australian.

Mr. G. Hill showed thirty interesting lantern slides of views which he had taken in North-West Kimberley and Northern Territory. The views were selected with the object of showing the class of country in which certain birds were to be found, to enable one to make a comparison of the geological, floral, and avi-

faunal features of the two regions. He was struck with the fact that so many species of plants and birds are common to both regions, and mentioned a number of examples. The very restricted range of such birds as *Leucotreron alligator*, *Petropharsa rufipennis*, and *P. albigennis* was commented upon. Many views taken in North-West Kimberley might be shown as typical views of many localities in the Northern Territory. In referring to Mr. W. M'Lennan's recent trip to the King River, he said he could appreciate the many difficulties and hardships experienced by that collector. The rugged nature of some of this country, the hostility of the natives, the difficulty of procuring food, and the attacks of insects and other pests, all contributed to make the collector's life an exceedingly strenuous one.

In the discussion that followed, Mr. A. J. Campbell said he was very interested in the views and in the remarks made in reference to them, especially in view of a paper he had in course of preparation. In the paper he would refer to the question of the separation of certain species of birds within a definite zoological region into several sub-species. He thought Mr. Hill's remarks were of particular interest in this connection. Mr. W. B. Alexander said he had noticed a great similarity in the species of insects and mammals received from North-West Australia and the Northern Territory, particularly amongst the butterflies and kangaroos. There was no doubt, in his opinion, that North-West Kimberley and the northern portion of the Northern Territory are one zoological region. Mr. Le Souëf thought that Mr. Hill had modestly passed over the difficulties and dangers met with by a naturalist in Northern Australia. In referring to the tall grass which covered most of the country in the summer months, he said that even when mounted on horseback one had difficulty in finding one's way about, the coarse grass in many places being so high. He quite concurred with what the lecturer stated regarding the distribution of species in various types of country.

HON. LIBRARIAN'S REPORT.

In order that the various periodicals received in exchange for *The Emu* may be accessible to members, the Council has decided to have the volumes bound and placed in the Union's room. Owing to lack of funds, only the ornithological journals are being bound at present, but it is hoped ultimately to bind all the periodicals received. In the case of a considerable number of the journals it was found that back parts were missing, but requests were sent to the various societies and individuals concerned, with the result that in most cases these parts were replaced free of charge. Bound volumes of the following periodicals are now on the shelves in the Union's room:—*Austral Avian Record*, *South Australian Ornithologist*, *Ibis*, *Auk*, *Condor*, *British Birds*, *Revue Francaise d'Ornithologie*, *Avicultural*

Magazine, Bird-Lore, Wilson Bulletin, Journal of the South African Ornithologists' Union, and Zoologist.

REPORT ON THE RINGING OF WILD BIRDS.

So far as the records go, the first ringing of wild birds took place on 25th March, 1913, at Forest Caves, Phillip Island, Victoria, when Messrs. L. G. Chandler, J. Gabriel, and H. Slaney placed aluminium rings on 51 adult and young Short-tailed Petrels or Mutton-Birds (*Puffinus brevicaudus*). All rings used were numbered consecutively, and marked "B.O.C." (Bird Observers' Club), "Melbourne." Then at Mud Island, Port Phillip Bay, Victoria, on 10th January, 1914, two of our members—Messrs. L. G. Chandler and H. Slaney (both at present on active service)—placed aluminium rings on the legs of 44 adult and young White-faced Storm Petrels (*Pelagodroma marina*).

Later on the subject of ringing birds was brought up before the R.A.O.U., and it was decided to alter the markings on the rings to "Inform R.A.O.U., Melbourne," and this was at once carried out, and a specially printed register was obtained, so that now all particulars of birds rung by either the B.O.C. or R.A.O.U. members are permanently recorded.

Under the new arrangement the following ringing has taken place by R.A.O.U. members:—

11th December, 1915, Mud Island, Victoria.—42 *Pelagodroma marina*.

2nd January, 1916, The Nobbies, Victoria.—20 *Puffinus brevicaudus*.

15th December, 1916, Mud Island, Victoria.—39 *Pelagodroma marina*.

8th December, 1917, Mud Island, Victoria.—25 *Pelagodroma marina*.

30th November, 1918, Mud Island, Victoria.—57 *Pelagodroma marina*.

From the above it will be seen that 95 birds were rung by the B.O.C. and 183 by the R.A.O.U., making a total of 278 birds actually rung.

In the middle of February, 1914, a dead *Pelagodroma marina* (White-faced Storm-Petrel) with a B.O.C. ring numbered 6 on its leg, was picked up at Gembrook by "Ekans," and forwarded to Mr. Donald Macdonald. This bird was rung on 10th January, 1914.

On 30th November, 1918, during a ringing visit paid to Mud Island, a Petrel was found in its burrow bearing a R.A.O.U. ring numbered 116. This ring was placed on this bird on 16th December, 1916.

As time passes many more birds will no doubt be rung, and it is confidently expected that valuable information on migration will be gathered thereby.

A. CHAS. STONE, *Recorder.*

REPORT ON THE R.A.O.U. OOLOGICAL COLLECTION.

Within the space of a few months the Union has become possessed of a splendid collection of Australian birds' eggs, numbering over 700 sets, and containing about 500 species according to the Union list, all side blown, and full data. This fine result is principally owing to the generosity of Messrs. H. L. White, Thos. P. Austin, and J. H. Bettington.

The following have also generously helped the collection from time to time :—Miss J. A. Fletcher, Capt. Cochrane, R.N., Messrs. G. F. Hill, F. E. Wilson, F. E. Howe, and A. Chas. Stone.



Corner in the R.A.O.U. Room, Melbourne, showing the "H. L. White" and "T. P. Austin" Egg Cabinets, and the Library containing the great works of Gould and Mathews, the gifts of H. L. White.

PHOTO. BY A C STONE.

The collection is housed in two handsome blackwood cabinets presented to the Union by Messrs. H. L. White and Thos. P. Austin. Each cabinet contains 34 drawers (18 inches x 30 inches) arranged in two tiers, and all are furnished with locking glass tops. The drawers are fitted with graduated cardboard trays lined with white cotton wool, in which the sets are arranged according to classification, and with each set is placed a ticket setting out the scientific and common name, date of finding, locality, name of finder, and other interesting particulars where procurable.

An illustrated catalogue of the collection has been compiled,

but photographs of birds, eggs, and nests are urgently needed to help completion. Members and friends are also invited to donate sets of eggs to the collection with the view of making it of greater scientific and educational value.

The collection may be inspected by members at any time.

A. CHAS. STONE, *Curator*.

REPORT ON THE SKIN COLLECTION AT THE R.A.O.U. ROOM.

With the assistance of Dr. Brooke Nicholls and Mr. F. E. Wilson, I have arranged roughly the collection of bird-skins in the R.A.O.U. room, which were mostly unnamed, except those kindly donated by Mr. H. L. White, Mr. F. E. Wilson, and others.*

Of Australian skins there are 297 kinds (including 3 sub-species), or a total of 965 skins, besides a number of New Guinea (about 45) and about 260 extra-Australian species, making a grand total of 1,270 specimens.

Regarding the history of the main collection, the Council purchased it from Mr. A. Coles, Bourke-street, for £10—almost a gift, notwithstanding most of the specimens were without data. Mr. Coles obtained the collection from the widow of the late Mr. Joseph Andrews, a good field ornithologist and intimate friend of the late Mr. Kendall Broadbent, of the Queensland Museum. Unfortunately, owing to the melancholy circumstances surrounding Mr. Andrews' death, the data of the collection were lost.

The collection has now been named, or rather numbered, in accordance with the Union's official "Check-list," which, with its ready reference to plates and literature, was found very helpful for the undertaking. An interleaved copy of the "Check-list" (as a catalogue) will be left in the room, with the Australian species indicated, and showing sexes where possible.

The collection is a nucleus of a good working one, and will prove exceedingly useful to members for ready reference for the commoner kinds. There are several duplicates of the more southern forms, and if exchanges could be effected with, say, the Western Australian and Queensland Museums, the collection would become still more useful. But this is merely a suggestion.

The Council is indebted to Mr. D. Le Souëf, our present hon. secretary, for his generous and valuable gift of an insect-proof cabinet for the collection; but a cabinet with more roomy drawers is still required for some of the larger skins, which are yet in ordinary packing cases.

A. J. CAMPBELL,
Hon. Curator, Skin Collection, R.A.O.U.

* This does not include mounted specimens or those under glass, which are acknowledged in the hon. secretary's report.

A Valuable Gift to the R.A.O.U.

("THE BIRDS OF AUSTRALIA," by Gregory M. Mathews, F.R.S.E., vols. i.-vi.)

THAT generous patron of Australian ornithology and friend of the Union, Mr. H. L. White, of Belltrees, Scone, has added one more to his long list of benefactions. The Christmas gift of Mathews's "The Birds of Australia," volumes i.-vi., beautifully bound in green morocco, came as a complete surprise to the Council. Several members have already spent busy days in the R.A.O.U. room, suggested and made possible by Mr. White. There, available for scientific research, the student now has Gould's "Birds of Australia," Mathews's "Birds of Australia," Broinowski's "Birds of Australia," Legge's "Birds of Ceylon," Campbell's "Nests and Eggs of Australian Birds," and many lesser works.

The six volumes of Mathews's "Birds of Australia" so far completed contain a treatment of about half the birds of Australia.

Vol. i. deals with the members of the first six orders of Australian birds. The well-known flightless birds, the Cassowary and the Emu, with the three extinct Emus of Tasmania, Kangaroo Island, and King Island, are grouped in the sub-class *Palæognathæ*. The remainder of the Australian birds are placed in the sub-class *Neognathæ*. The Scrub-Fowls, Mallee-Fowls, and Brush-Turkeys—the marvellous mound-builders—are described, with copious field notes from various Australian field workers, many of whom are members of the Union.

The Quails, the three-toed Bustard-Quails, and the Australian Plain Wanderer, are figured life-size. The twenty-five fine plates of Pigeons strengthen the claim of the Australian region to be regarded as the headquarters of Pigeons.

Two of the three Australian Grebes are referred to species represented in Britain. Mr. Mathews's investigations show the close relationship of many Australian birds to well-known European species. The Peregrine Falcon and the Barn Owl come readily to mind. The old practice of naming birds as distinct until they were proved to be the same deprived the student of the knowledge of the relationship and of the use of much literature. Students appreciate greatly Mr. Mathews's efforts to place the Australian avifauna in its proper position amongst the world's birds.

An account of the three Australian species of Penguins, those remarkable southern birds, completes an interesting first volume.

Vol. ii. contains results of a most exhaustive investigation of the Petrels, Albatrosses, Terns, Gulls, and Skuas—birds mainly characteristic of ocean and shore. Mr. Mathews produces evidence to discredit the accepted ideas of the winter whereabouts of Mutton-Birds, so numerous in the nesting season on the islands of Bass Strait. He indicates his belief that they do not travel far from their breeding-places. He suggests the need for further research, and rejects some species from the Australian

list. In this issue of *The Emu* Mr. Alexander shows the necessity of defining "Australian Seas" as a preliminary to such action.

Vol. iii., the largest of the series, deals with the Waders, the Australian Crane, the Australian Stork, the Ibises, Herons, Egrets, and Bitterns.

A full treatment is accorded the Waders, many species of which are cosmopolitan, and are of great interest, because of the remarkable Siberian migration of over 30 Australian forms. Some well-known names are shown to have been used for the wrong birds. The Australian Dottrel is included with the Pratincoles in the family *Glareolidae*.

The name used for the Australian Crane—*Mathewsia**—was given by Iredale, the old name, *Antigone*, being considered invalid.

The Blue and White Reef-Herons, previously thought to be the one species, are treated by Mr. Mathews as two distinct species, which he names *Demigretta matook cooktowni* and *D. greyi*. Further investigation is required.

Vol. iv. treats of the large swimming birds—Swan, Geese, and Ducks—of the order Anseriformes, and the totally webbed swimmers—Cormorants and Darters, Gannets, Frigate-Birds, Tropic-Birds, and the Australian Pelican—of the order Pelecaniformes. Mr. Mathews resorts to fine generic distinctions for the Ducks, but that has become a habit with him. The five Australian Cormorants, previously placed in one genus, are now placed in four genera. The four Gannets previously placed in the genus *Sula* are also assigned to four genera. The thirty-five species described in this volume are placed in thirty-two genera.

Vol. v. contains the birds of prey—diurnal (Hawks and Eagles) and nocturnal (Owls). Fine generic distinctions are again used.

In a very long discussion on the Boobook Owl, Mr. Mathews gives evidence for considering that the New Zealand and Australian forms are con-specific. No less than four plates, all named as separate species, are devoted to this interesting bird—the "Cuckoo-Owl" of the earlier settlers. The numerous references and extensive synonymy of the Boobook Owl occupy three pages, so exhaustively has the author treated his subject and so variable is the bird.

Again Mr. Mathews shows the close relationship of some Australian birds to those of other lands. The "Delicate Owl" is shown to be con-specific with the British Barn Owl. Four plates, each named as a separate species, are given of the Masked Owl, further investigation having convinced this critical and honest worker that they were really the one species. Mr. Mathews shows that *Tyto* should be used instead of *Strix*, though he mentions a prior *Tyta* that may possibly invalidate that name on account of "one-letterism." Where two names are derived from the same root or roots, some claim that only the first-used name can be valid. Thus the name *Meliphaga* for a honey-eater is claimed by Mr. Mathews to be invalidated by a prior *Melophagus*

* Altered to *Mathewsena*, *Austral Avian Record*, vol. ii., p. 88.

(the sheep tick): it has, however, not yet been shown that these words are from the same roots. *Mel*, honey; *melo*, an apple; or possibly some other root may be concerned. This and many similar disputed names await settlement by the International Commission. Mr. Mathews has since discarded *Tyto*.

Vol. vi. is devoted to Cockatoos and Parrots, which make up the typical Australian order of birds. A full account of the literature of the group is given. In a long discussion Mr. Mathews shows that the name *Cacatua* should be replaced by *Cacatoes* as the name for the White Cockatoo. He suggests a new family, *Pezoporidæ*, to contain the Ground-Parrot, the already extinct Night-Parrot, and the Warbling Grass-Parrot—the common Budgerigar of the bird-trappers. He regards the Ground and Night Parrots as the most primitive forms, and the Brush-tongued Lorikeets (family *Trichoglossidæ*) as the most highly developed of the Parrot order.

With regard to sub-species, made in hundreds by Mr. Mathews, some ornithologists object to the fine distinctions employed. Others, however, are watching with interest the evolution of the splitting to the fine limits that render it valueless and burdensome, and reduce the splitter to Mr. Mathews's conclusion concerning the Brown Hawk—that "the only alternative (to the use of a binomial name) is the usage of quadrimomials, as *Ieracidea berigora berigora* > < *kempi*." A simple, exact method of indicating the bird is to use the binomial name with the locality name added. Thus, *Ieracidea berigora* Katherine River would indicate the bird exactly, and give information concerning its locality. If the series of many species in this great land of few natural barriers were made complete, Mr. Mathews would often find that trinomials would fail. However, that stage has so far been reached in but few cases. In some of the earlier volumes each sub-species was described and numbered separately; but in later volumes the better plan of discussing all races together, after a description of the species and its literature, has been adopted.

A considerable amount of present-day controversy has been introduced into this great work of reference that for many years must be the standard for Australian ornithologists. This controversial matter detracts somewhat from the permanent value of the work.

Changes of opinion concerning nomenclature by the author have somewhat reduced the value of the work as a reference for nomenclature. Publication began in 1910, when Mr. Mathews was working on the lines of Sharpe's "Hand-list of the Birds of the World," as set out in Mathews's "Hand-list of the Birds of Australia."* In 1912 Mr. Mathews was, in his "Reference-list," † a "lumper" as regards genera. In 1913, Mr. Mathews, now a "splitter," issued his "List of the Birds of Australia." Since then he has continued to "improve" and develop his ideas, with

* Supplement to *Emu*, vol. vii.† *Novitates Zoologicæ*, vol. xviii.

the result that his great work does not represent his latest views, except possibly in the latest parts. Many of the plates bear a different name from that used in the letterpress. However, Mr. Mathews has achieved his main aim—after all, the chief purpose of the scientific worker. He says, in the preface of vol. v. :—“My only aim is to secure the truth and put the Australian avifauna in such a state that my successors will be able to treat it with the fewest complications.” This he has achieved by absolute candour and open-mindedness. He certainly is open to conviction, and is the keenest critic of his own work, which he constantly seeks to “improve.”

One tendency must be regretted. Mr. Mathews's desire is to be to achieve “consistency.” It is doubtful if consistency as regards generic division is worth achieving—indeed, it has been said “consistency is the least of all the virtues.” In striving for consistency Mr. Mathews has in numerous cases deprived generic names of all value. He uses trinomials, but the first and second names are mostly synonymous. The generic name has no value; as “W.S.,” in *The Auk*, in a review of the last published part of Mr. Mathews's work, says, “the value of the generic name is *nil*.” Having reduced the value of the generic name to “*nil*,” what has Mr. Mathews gained? Consistency in generic division, he would doubtless claim. To some it seems unnecessary to apply the same standards of fine division to thirty-five orders, containing two-fifths of the world's birds, as are necessary in dividing the one order—Passeriformes—containing three-fifths of the 19,000 species of birds given in Sharpe's “Hand-list.” Possibly Mr. Mathews has gained consistency, if that were possible, but he has caused much confusion and has benefited ornithology little in this regard. Further, he has rendered desirable the use of super-genera, or some such, to replace the old genus, a convenient basis of comparison for the birds of different regions. Fortunately, this is only a phase, that possibly will not long trouble ornithologists. Mr. Mathews is working loyally as a member of a committee of the B.O.U. to prepare an authoritative list of the birds of the world. We know him both as a “lumper” and a “splitter,” but always as a keen, able, and determined seeker after truth. With his vast store of material, knowledge, and experience, it is expected that a list acceptable to all will soon be issued.

The hand-coloured plates represent high-water mark in bird illustrations. The birds are beautifully and artistically drawn, and coloured true to nature. Such a slight error as the female Blue-billed Duck, correctly stated as having a green bill, but figured with a blue bill, is merely the trifling exception that proves the rule. Most of the birds are excellently posed, though a few in the Parrot volume leave something to be desired in this connection.

Publishers, artists, printers, and binders have done their part well for this important work—easily the biggest Australian work since the time of John Gould, in the forties and early fifties.

Mr. Mathews is to be congratulated on the time, energy, money, ability, and persistency with which he has followed his great and worthy purpose—to produce a fully-illustrated, up-to-date, reliable, and complete reference work which will assist future scientific investigators of Australian ornithology to conduct their research with the “fewest complications.” So thoroughly has he done his work, and so persistently has he followed every doubtful point, that finality appears to be approaching rapidly. With the hundreds of changes made by Mr. Mathews, little in this direction will be possible for the ornithologist of the future. Mr. White has been heartily thanked for making available to our members this mass of up-to-date information concerning the birds themselves and the full, clear statement and criticism of the literature concerning each species.

Correspondence.

(Continued from p. 217.)

“THE BIRDS OF AUSTRALIA” (MATHEWS).

To the Editors of “*The Emu*.”

SIRS,—As *The Emu* is purely for science matter and not for commercialism, it is with the greatest reluctance I pen these lines.

Mr. Gregory M. Mathews, in the preface of vol. vi. of his great work, “*The Birds of Australia*,” has interfered in a difference I had with his publishers in the columns of *The Australasian*, and accuses me of untruthfulness in a place where I cannot defend myself—to wit, in his own book. Therefore, in self-defence, and as an office-bearer of the R.A.O.U., I crave your indulgence for a brief reply.

Whether I did, or did not, believe that the work would be “completed in eight volumes at a prospective cost of £70,” the fact remains that vols. iii., v., and vi. (the one in which Mr. Mathews takes me to task) have each been increased one part—*i.e.*, each vol. has been increased two guineas over and above the amount given in the prospectus. What, then, does Mr. Mathews mean when he states that “my subscribers do not pay for this extraneous matter—I do all that”?

The publishers apparently rely on a short line in their prospectus to save the situation as regards *extra* parts:—“Other volumes will be, so far as can be seen, as follows.” But subscribers claim that this innocent sentence of doubtful grammar can also be construed in their favour. A volume, when completed, may contain a part less “so far as could be seen” at first. But “so far” subscribers have paid for three, if not four, extra parts at £2 2s. each, with the promise of more extra parts to follow, seeing that the work is yet far from completion. That, sirs, is my case. In the matter of extra parts and cost I hold two letters from subscribers to Mr. Mathews’s work—one in Tasmania, the other in Queensland—both strongly backing my complaint.

Solely in the interests of Australian ornithology, I claim to be one of Mr. Mathews's best friends; therefore I hope he will take this "rebuttal" in the spirit in which it is given.—Yours, &c.,

A. J. CAMPBELL.

The Dry Season.

Birds and Drought.—The many water-fowl in southern Victoria lately indicate how dry the northern districts of New South Wales and Southern Queensland must be. For instance, take as near to Melbourne as Woodend. I lately saw a paddock literally covered with Straw-necked Ibis feeding on caterpillars, &c.; also, on isolated water-holes, were frequently pairs of Spoon-bills, White-fronted and Pacific Herons—the latter generally seem to drive off any others of their kind that wish to come to their particular pond. Cormorants are much more plentiful than usual, frequently visiting small ornamental ponds in private gardens for the sake of the gold-fish. I shot a large Black Cormorant in the Melbourne Zoo lately that had swallowed a gold-fish that weighed three-quarters of a pound, so these birds are no good in such places. Only a month ago a Darter, which is a rare bird in Victoria, was seen in the National Park at Wilson's Promontory, and a skin of this bird was sent lately from the Western District of Victoria by a well-known resident, asking what bird it was: yet the inquirer had been an observer of bird-life in that district for 40 years! Fish are having a bad time at present. *Tribonyx*, Coots, and Pectoral Rails are just as plentiful in districts where they are rarely seen.

Large flocks of Crows, apparently *Corone australis*, are very much in evidence in southern Victoria this year—probably the old birds with their young. I have seen several distinct flocks lately (December); possibly the dry season up north is bringing them further south than usual. Their loud, raucous call can be heard for a considerable distance, especially when hundreds utter it at the same time. Insect life must be more plentiful than we usually realize when these hundreds, or we may say thousands, of birds can find sufficient food to eat.—S. J. CECIL LE SOUËF. Melbourne.

Nomenclature.

Now that the war has been happily ended, and the members of the Check-list Committee who are on active service will be returning, the work of preparing the second edition of the "Official Check-list" will be resumed. It will interest members to know that a strong committee of ornithologists has already begun the preparation of an authoritative list of the world's birds.

Meanwhile, the Council has confirmed its previous determination that authors of papers should use the names of the Official "Check-list," but may, if they so desire, add the name used in Mathews's 1913 "List."



THE RED-CERED PIGEON.

Globigera rubricera.

The upper bird shows the red cere as in the breeding season.

The Emu

Official Organ of the Royal Australasian Ornithologists' Union.

"Birds of a feather."

VOL. XVIII.]

1ST APRIL, 1919.

[PART 4.

A New Pigeon Recorded for Australia—the Red-cered Pigeon (*Globicera rubricera*).

BY J. A. KERSHAW, F.E.S., CURATOR, NATIONAL MUSEUM,
MELBOURNE.

IN the *Austral Avian Record* (vol. ii., No. 5, 1914) Mr. G. M. Mathews recorded two additional species of Pigeons for Australia. One of these he had previously recorded among his additions to the Australian avifauna in his "List of the Birds of Australia" under the name of *Globicera pacifica lepida*, but, after its comparison with Cassin's type of *Carpophaga lepida* in the collection of the Academy of Natural Sciences of Philadelphia, he described it as a new sub-species, and gave it the name of *Globicera pacifica queenslandica*.

The other species recorded is *Globicera rubricera lepida*. This was described by Cassin* in 1854, under the name of *Carpophaga lepida*, from a single specimen in the collection of the Academy of Natural Sciences.

According to Cassin, the specimen was obtained in Europe by Mr. Edward Wilson, and was labelled "Northern Australia (?)."

Apparently on the statement of Mr. Stone, of the Academy of Sciences Museum, "that the locality had never been doubted,"† Mathews decided to include this species in the list of Australian birds; but in view of the remoteness from Australia of the known habitat of the species, which appears to be restricted to the Bismarck Archipelago, and the absence of any other Australian record, it seems possible that a mistake has been made in the locality. However, to draw attention to the need for further investigation, this fine Pigeon is figured here.

The two specimens which form the subject of the coloured plate are from New Britain and the Duke of York Island, and are in the collection of the National Museum, Melbourne.

* Proc. Acad. Nat. Sci. Philad., vol. vii., p. 230, 1854.

† Mathews, *Aust. Avian Rec.*, vol. ii., p. 84, 1914.

Notes on Birds Breeding in Dampier Archipelago, N.W. Coast of Australia.

By F. LAWSON WHITLOCK, "CHILTERN," TUDOR, *via* ALBANY
(W.A.)

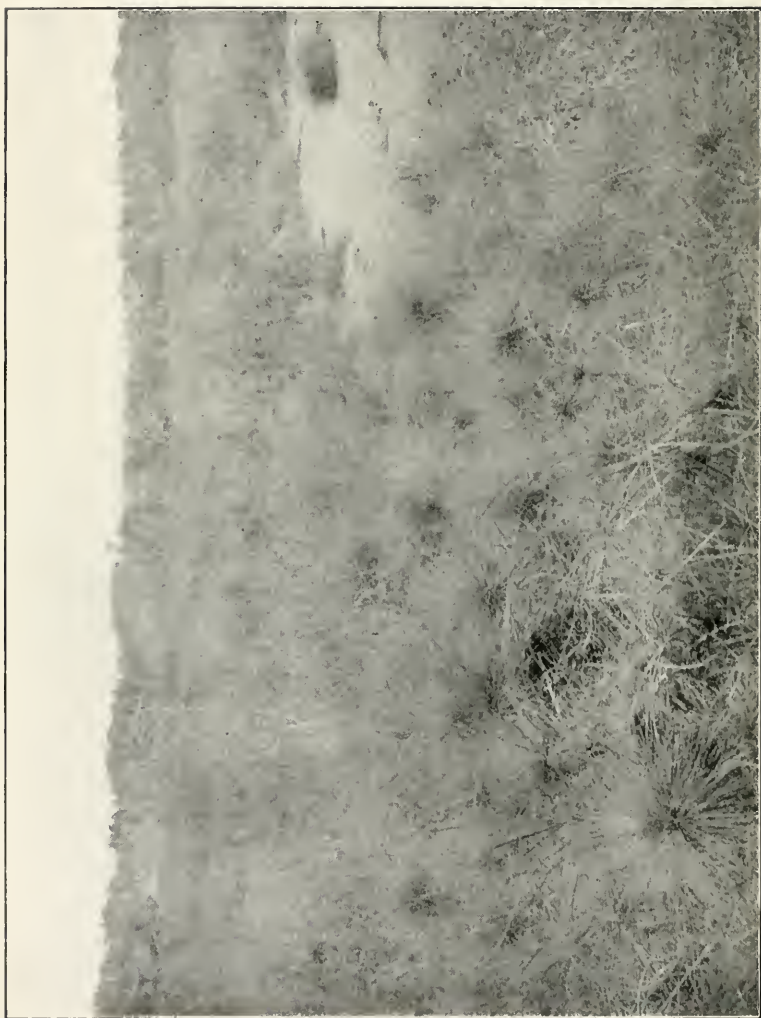
THE Dampier Archipelago extends along our north-west coast for a distance of about 200 miles. In travelling north the first islands are met with before reaching Ashburton Roads, and the last (Depuch Island) at Balla Balla Anchorage, about 30 miles north-east of Point Samson.

Viewed from the deck of a steamboat, the islands present a very unattractive appearance. As a rule, they appear much the same—long, low, treeless islands, utterly barren were it not for a low scrub just discernible with the aid of a field-glass. To the field ornithologist, however, they suggest possibilities of breeding Petrels, Gulls, Terns, and the larger birds of prey, with the chance, on the larger islands, of isolated families of land-birds, differing in plumage from kindred families on the mainland, and specially interesting on that account.

The majority of the larger islands are too near the coast to promise much in this respect, but in the case of Barrow Island, the largest of the group and over 30 miles distant from the mainland, and still more so in the further isolated Montebello Group, one may look with confidence to the discovery of interesting islands forms and varieties.

Geologically speaking, all the islands have at no very distant date formed part of the mainland, and the surrounding seas are for the most part shallow.

I have previously written a brief account of my former visit to Barrow Island (see *Emu*, xvii., pp. 171-179). This was accompanied by a map copied from an almost illegible Admiralty chart. I regret to say, from observations made during the present trip, I find the chart unreliable. I refer chiefly to the long axis of the island, which is shown on the chart to be almost north and south. I had a good boat's compass on the cutter, and often took an observation about mid-day to confirm our time by clock; also, I usually saw the sun rise and again set, and when camping out noted the positions of the early morning constellations. My observations point to the fact that the long axis of Barrow Island approximates much nearer to east and west than to north and south. Again, the neighbouring Double Island has a long axis running almost at right angles to the true axis of Barrow Island, and not parallel to the latter, as shown in the chart. Furthermore, a large island immediately adjoining Double Island is not shown in the chart at all. At the eastern end of this island is a huge rocky islet, rising to a height of about 200 feet—a most conspicuous landmark. This, too, is not marked on the chart—an unfortunate omission, in an ornithological sense, as it is the home of a small colony of Caspian Terns



On Barrow Island. True Spinifex (*S. longifolius*) and Mangroves in the background.

and of a very large colony of Pied Cormorants. In mentioning these matters it is only fair to add that the survey of Barrow Island is incomplete, and probably only approximate. I propose the names of Osprey Island for the larger island and Cormorant Island for the smaller one.

When, in October and November of last year, I paid a flying visit to Barrow Island, the breeding season, as far as land-birds were concerned, was over, and, as my chief concern was to reach the island as quickly as possible, little opportunity occurred of paying attention to the smaller islands passed *en route*. I was greatly struck with the number of the larger birds of prey observed, notably the White-bellied Sea-Eagle (*Haliaeetus leucogaster*) and the White-headed Osprey (*Pandion leucocephalus*), and I hoped at some future date to pay a visit to the Archipelago when these species should be breeding. This hope was realized during the present season, when Mr. H. L. White, of Belltrees, N.S.W., asked me to undertake a more extended trip amongst the islands, making Barrow Island my chief objective, as before. Mr. White and Mr. J. H. Bettington, of Merriwa, N.S.W., financed the expedition.

I left Cossack on 4th July in a twenty-foot sailing boat, with one Japanese boatman, and landed on Barrow Island eleven days later. I was somewhat delayed by strong south-easterly winds, which raised a big sea at times, and, as a dinghy was being towed behind, my boatman was cautious. These delays, however, gave me opportunities of landing on the islands where we were sheltering, and I had many interesting experiences with nesting Sea-Eagles and Ospreys.

The following notes do not purport to be more than a brief account of the birds I found breeding in the Dampier Archipelago during the months of July and August, 1918. Other sea-birds were present, especially Terns. Angle Island showed signs of a colony about to take up its residence there for breeding purposes. I did not get a chance to obtain a specimen, so cannot say with certainty what they were. Brown Gannets were seen in small numbers, and a small flock of Frigate-Birds was seen circling above Legendre Island, and I watched, at close quarters, a Darter (*Plotus novaehollandiae*) drying its wings whilst perched on the handrail of a bridge near Cossack.

With regard to animal life, I found wallabies and bandicoots very plentiful on Barrow Island. The latter were quite a nuisance at my camp, and I was much disturbed at night by their coming into my tent. Shooting them was no good, but I eventually beat them by surrounding the tent with some sheets of corrugated iron which I disinterred from the wreck of an old hut.

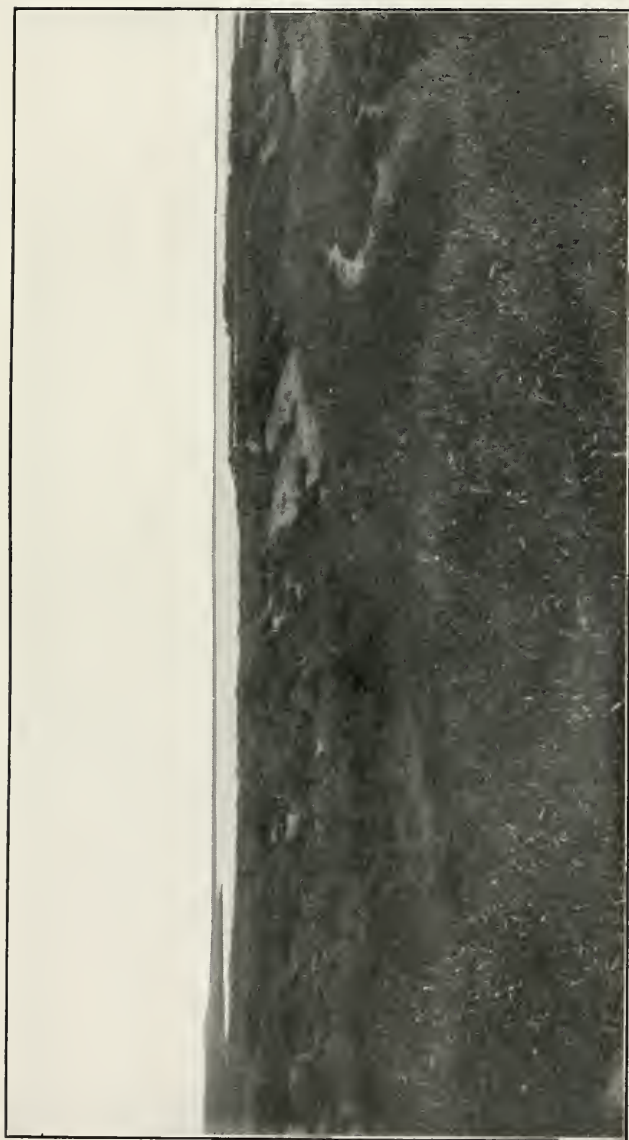
Whilst engaged in watching Spinifex-Birds after sunset, I frequently saw rats of a very small species, but they were too quick for me to get a good look at them.

Whales were frequently seen during the boat voyage—often close enough to distinguish a young one swimming by the side

of the female. Fish seemed abundant everywhere, and my boatman caught a good many crayfish.

Pandion leucocephalus. White-headed Osprey.—This fine species is the most prominent bird of prey inhabiting Dampier Archipelago. Few islands are without a pair, and some of the larger islands, like Fortescue Island or Sholl Island, possess as many as three occupied eyries. As a general rule the large, massive nests are placed on rocks or on low sand-hills immediately above the high spring-tide line. On some islands a few stunted and very woody bushes grow immediately on the inner side of the sand-hills. It should here be noted that most of the islands are saucer-shaped, and in the hollow interior vegetation is more prolific than on the surrounding sand-hills. Ospreys not infrequently pile their huge nests on the tops of these bushes. In one or two instances I found nests built on the ground in the interior of an island. All were very elaborately constructed of sticks, seaweed, and sponges. Very often a piece of deal or other soft wood was added. Near Legendre Island I saw an Osprey staggering along with a stick that must have been four feet long, and fairly thick in proportion; it was just about as much as the bird could manage. The majority of the nests appeared like the work of several seasons, and, being constantly added to, attained a height of three feet or more. The top of the pile, on which the eggs rest, was always flat, and composed of a cushion of brown seaweed and small pieces of sponge, with fragments of coral and shells. The eggs varied from one to three, and in the latter case a considerable time seemed to elapse between the laying of the first and last egg. It might be thought that such richly-marked eggs would be conspicuous in the nest. This is far from the case, the rich chocolate markings on a white background harmonizing very well with the brown seaweed and bits of broken shell or coral usually found in the nests. Generally one of the parent birds watches near the nest, even before the eggs are laid; but it is never left unguarded once the female has begun to lay. On landing near a nest, one or both parents fly to meet the intruder, uttering querulous whistling notes whilst hovering overhead. If the nest contains eggs both birds fly anxiously about. After a little experience one knows pretty well where to search from watching the flight of the parents. All avian intruders, especially Sea-Eagles, are jealously driven from the neighbourhood of the nest. The female is not a close sitter, and leaves the nest often before it can be detected. On the extensive Barrow Island, which has a coastline of over 40 miles, Ospreys are not plentiful; but on the neighbouring Double Island, which is simply an island of steep, conical sand-hills with occasional flats clothed with snake-wood and other vegetation, three or four pairs were nesting. Some of these conical sand-hills were clothed with a species of convolvulus, locally called "shore-runner," right up to their summits; and in several cases Ospreys had wisely chosen these particular sand-hills for nesting-sites. The growth of convolvulus did much towards making the nest inconspicuous; one was so well concealed as to be only revealed by observing the sitting bird spring from the nest some distance away. A pair of Ospreys I had under observation on an islet not a quarter of a mile from my camp at Barrow Island behaved in a very erratic manner. I first noticed them continually bringing building material to an old nest in a solitary mangrove. After much labour had been expended they suddenly started to repair an old nest in the sand-hills

PLATE XXXVII.



Whitlock Cove, Barrow Island.
Whitlock's Camp was in the Mangroves seen on the right of view.

PHOTO. BY F. L. WHITLOCK, R.A.O.U.

about half a mile away, paying occasional visits to the nest in the mangrove; but, though I remained on Barrow Island about six weeks, up to the time of my departure no egg was laid in either nest. The breeding season commences about the end of June in these latitudes. On 5th July I found a full clutch in a nest built on a coral beach where a colony of Caspian Terns was nesting. The latter species did not appear to be troubled by the presence of the nesting Ospreys. About half a mile away was another nest placed on a ledge in a rocky cliff. On Bezout or Leper Island a pair had a nest on a precipitous spur of rock. These were the only nests not easily accessible. Near another nest, containing three eggs, a colony of White-fronted Ternlets was breeding. Mr. H. L. White writes me that for a small series these Dampier Archipelago eggs are richer in markings than any other he has previously examined. Certainly they are infinitely more beautiful than a set of four I obtained later on in the season on Dirk Hartog Island, some 500 miles further south.

Once the young are hatched, their parents cater liberally for them. In a nest containing two fully fledged young, on Delambre Island, I counted the remains of twenty-seven fish, the majority but little eaten. On a close approach to this nest both young menaced me with open beak and outspread wings. They presented a noble appearance, with their angry, yellow eyes. Taking hold of them by the tips of their expanded wings, I gave them a start, when both flew gracefully out to sea, to return in a few minutes and perch on a large rock. Both parents, in the meantime, hovered anxiously overhead.

Newly-hatched young are covered with a dense fawn-coloured down. An infertile egg taken from a nest containing one young bird a week old has the ground colour almost yellow. The eggs varied considerably in the size and intensity of their markings, but, as a rule, large chocolate blotches prevailed. Some had underlying markings of neutral colour, and in one exceptionally handsome egg the markings nearly obscured the ground colour. In several sets infertile eggs occurred.

Halæetus leucogaster. White-bellied Sea-Eagle. — The White-bellied Sea-Eagle occurs on many of the islands of the archipelago. Even those of a very small area possess a pair, but, with the exception of Barrow Island and some of the larger islands like Dolphin, Angle, and Gidley Islands, which lie near to the mainland, never more than one pair is found on the same island.

They are very conspicuous birds, and it was my practice, when landing on an island, to ascend the nearest and highest sand-hill and from thence take a sweeping glance around the horizon with my field-glasses. If Eagles were present, I seldom failed to discern their gleaming white heads and necks against the dark background. I had many interesting hours with this species, and in all must have examined about twenty nests. Hitherto I had always associated Eagles' nests with rocky precipices or huge, unclimbable forest trees. It was a new experience, therefore, to find nests on bushes, sand-hills, and even on the flat ground of the interior of an island and on the verge of a low cliff. In the Dampier Archipelago this species must begin nesting early in June, or even in May, for I found a nest on one island containing young at least ten days old on 13th July. The first nest I found containing a pair of eggs was on 6th July. The site was a low cliff on the west side of a rather small island. Before

I landed I noticed an Eagle alight on the edge of the cliff, in the very early morning; but even with the aid of the glasses I could discern no nest. When I landed I commenced the search by a tour all around the encompassing sand-hills and cliffs. I had nearly completed the circuit before I came to the previously noted spot. Here, in a very slight hollow, very neatly lined with long grasses arranged in a circular manner, lay two large white eggs. There was absolutely no further attempt at a nest, but all around the shallow centre was a circle of Petrel wreckage, chiefly wings and tails. The flight feathers and rectrices were quite intact, but every bit of meat had been cleanly picked from the bones, and no heads, leg bones, or feet were visible. Whilst I was near the nest both parents wheeled around overhead, but uttered no sound. The eggs were quite fresh. On the same day I landed on another island some 12 or 15 miles away, where we anchored for the night. This was a larger island, and I estimated its area at about 500 to 600 acres. It was thickly clothed in the saucer-shaped interior with coarse grasses and a few stunted bushes. I soon noticed a pair of Sea-Eagles, and also a pair of Spotted Harriers (*Circus assimilis*). A tour of the sand-hills, however, failed to discover the nest. I sat down where I could command a view of the whole interior, and it was not long before an Eagle came gliding along, finally perching on a low bush near the further end of the island. I walked in the direction of this bird, which left its perch on my approach. I soon found traces of Eagles in the shape of Petrel wreckage and patches of feathers lying on the ground. Further search revealed a regular dining place, and, a little further away still, a very shallow depression in the ground, neatly lined with grasses and containing two eggs; these eggs were both infertile.

On my return from Barrow Island, some six weeks later, I had a further encounter with this pair of birds. In the meantime they had abandoned the nesting-site in the interior of the island, and had repaired to a heap of rocky *débris* on the shore, where they had either constructed or repaired a very large nest of the customary type. This nest also contained two eggs. On Barrow Island the White-bellied Sea-Eagle was more in evidence than the Osprey, and within a radius of six miles of my camp were no less than seven occupied nests. The majority of these nests contained young birds, but occasionally I found one young Eaglet and an infertile egg. Two nests were on the extreme margins of low cliffs, and were rather primitive structures. Another nest was on a rocky islet, accessible at low tide. Although this was an islet of very limited area, it contained the remains of three old nests, in addition to the tenanted one of the present season. This nest contained two young Eaglets that I estimated at quite three weeks old. They were thickly clothed with white down, with traces here and there of the growth of feathers. All the time I was examining them they lay absolutely motionless, and, had it not been for their open eyes, might have readily been mistaken for dead. They lay side by side, with their bodies flattened down and necks outstretched in a semicircular fashion. They were inert looking objects, and showed little promise of becoming noble birds like their parents, yelping and circling overhead. Another nest nearer the camp contained two eggs—one just chipping and the other blowable. I visited this nest pretty frequently, and was much struck at the slow progress the young Eaglet made. The weather was cool at the time, and I usually found one parent or the other brooding the young bird. It was fed on Petrels, caught, I presume,



Nest and Young of Sea-Eagle. Nest on Sand-hill.

PHOTO. BY F. L. WHITLOCK, R.A.O.U.

on the neighbouring Double Island, and also on the flesh of the small marsupials which abound on Barrow Island. It is somewhat puzzling how the Sea-Eagles catch so many of these nocturnal Petrels. I have reasons for thinking that the latter come out of their burrows to excrete during daylight, and that the Eagles seize the opportunity to prey upon them. I took two eggs from the nest of another pair, which had made their home on the edge of a cliff. Some quarter of a mile away was an untenanted nest built on a rocky point almost isolated from the mainland. This nest was occupied during my visit the previous season, so it would appear that the same nest is not always used in successive seasons. After I had robbed the nest on the cliff before mentioned, however, the parent birds returned to their old home, which they further enlarged and re-lined. It appeared to be ready for eggs just before I left Barrow Island. Other nests on Barrow and the neighbouring islands were built on or near the tops of sand-hills, usually screened on one side by a large snake-wood bush. Two I found by observing the gleaming white head and neck raised up as the sitting bird caught sight of my approach. On a sandy peninsula, the other side of the cove in which my boat was anchored, were the remains of several old Eagles' nests. These had been built on large snake-wood bushes. The nests had no doubt been added to at various times, until the weight of the superincumbent mass, perhaps soddened by a fall of rain, proved too much for the bush, and the whole structure had come crashing to the earth. Despite the numbers of Sea-Eagles on Barrow and the neighbouring islands, immature birds are not much in evidence. I noticed but two, and the wreck of a third one on the beach. Possibly the young are driven away by the parent birds when old enough to forage for themselves.

An Eagle's nest on Passage Island, built on a flat rock, which must have been sprayed by the waves in quite a moderate breeze, contained a young Eaglet and the hinder portion of a large sea-snake, freshly killed.

Haliastur leucosternus. White-headed Sea-Eagle.—This beautiful little Sea-Eagle is not frequently met amongst the islands of the Archipelago, the absence of extensive tracts of mangroves being the reason, no doubt. "Mangrove-Eagle" would be a good name for the species. It is seldom found away from these thickets. Near my camp was a small islet on which a clump of large old mangroves were growing. A pair of White-headed Eagles had their home there. The nest was in the largest bush, and was placed on a thick horizontal limb about 10 feet from the mud below. It was a large and well-made nest of sticks, the cup being deep and well lined* with soft seaweeds. The nest contained two heavily-incubated eggs. The female sat very closely, and did not leave her charge until I was climbing up to it. On one occasion I was standing under a nest, only two or three feet above my head, in a mangrove thicket at the north end of the island, when one of the parent birds alighted on the rim of the nest, and on catching sight of me remained gazing at me for several minutes before taking flight again. Another nest, on Double Island, was a very primitive affair, placed in a large snake-wood bush; it contained an infertile egg and a young bird, which menaced me with open beak and extended wings. This nest may have been the work of a Harrier in past seasons, and adapted by the Eagles subsequently.

Phalacrocorax hypoleucus. Pied Cormorant.—This fine Cormorant is met with throughout the archipelago, but the only breeding-place I visited was the prominent rocky island adjacent to the island I propose to call Osprey Island. The sides of this island rise precipitously from the surrounding sea, but at one place the cliff has fallen down, and it is possible without much difficulty to land there and ascend to the top of the island. On the south-eastern side of the island the cliff is terraced, and here the Cormorants have made their home. So numerous and close together were the nests that it was at times difficult to walk without treading on eggs or young. The nests were placed close together, and were well-made structures of coarse spinifex stems (*Spinifex longifolius*). At the time of my visit eggs in every stage of freshness and incubation, and young of all ages, were observed, but I noticed at the eastern end of the colony the young were nearer maturity than in other parts, and at the western end were many nests with uncompleted clutches. Four seemed to be the full complement of eggs. Looking down into the clear water at the foot of the cliff, it was suggestive of tragedy to come, for the young, to observe numerous large and hungry sharks cruising about.

Hydroprogne caspia. Caspian Tern.—The Caspian Tern breeds on the shores of many of the islands of the Archipelago. It is an early breeder, and I was much surprised to find young nearly able to fly on 5th July. I espied a colony of sea-birds on a coral beach as we sailed by Enderby Island. A pair of Ospreys, which I detected with the aid of my glasses, determined me to land. A nearer inspection proved the sea-birds to be Caspian Terns. In all there were about thirty to forty pairs nesting just above high spring-tide mark. The nests were merely slight depressions in the sand, and the eggs in every case numbered two, always deposited in the nest with the small ends pointing in opposite directions. As a rule, the pairs of eggs were very ill-matched, either in point of size or in the tone of their ground-colour. For aill that they did not exhibit any great variety. Sturt peas (*Clianthus dampieri*) were growing at this nesting-place. On several other islands I discovered smaller colonies, not exceeding half a dozen pairs; but on Cormorant Island was a larger colony, nesting on the summit of the rock. Despite the much later date, these eggs were fresh, and my Japanese boatman selected a few for culinary purposes.

Sternula nereis. White-faced Ternlet.—There were small parties of this little Tern on the beaches of several of the islands on which I landed. Though they pretended great anxiety, following me half round an island, perhaps, they were not really nesting. It was not until I was nearing Eaglehawk Island on my way home that I found a breeding colony. The site was a small rocky peninsula, cut off from the mainland at high tides only. A pair of Ospreys had a nest on the peninsula, and a number of young Caspian Terns were hiding in the coarse herbage. The White-faced Ternlets were nesting on a small patch of white coral sand. The nests were mere hollows in the sand, and were very close together, the whole colony not occupying half a chain of ground. There were two eggs in most of the nests. The parent birds flew overhead in one noisy, agitated flock whilst I remained near their nests. This was on 31st August. A few sets of eggs I selected were quite fresh.

Demigretta sacra. Reef-Heron.—Reef-Herons are found throughout the Dampier Archipelago. The dark slate-coloured form is much the commoner variety, and, though the white form was often present, it did not occur in pairs. On an islet near Barrow Island I found empty nests under slabs of sandstone thrown up by the heavy gales which sometimes occur in these latitudes. On some of the islands these slabs of rock are found in wall-like masses, and almost suggest human agency in their construction. On Eaglehawk Island I found a Reef-Heron's nest containing two fresh eggs under a huge rock, one of many thrown up by some extra violent blow. My attention was attracted to the nest by the anxiety of the parent birds, which flew from rock to rock, uttering their harsh, guttural notes. I could only reach the nest by lying down full length and half creeping into the cavity. The nest was a small affair, chiefly constructed of seaweed. Date, 31st August.

Butorides stagnatilis. Little Mangrove-Bittern.—I never saw this species far from the mangroves. It appears to be a shy, unobtrusive bird, not much in evidence during daylight. There were old or empty nests in the mangroves near our anchorage at Barrow Island, and I took one fresh egg from a nest in another mangrove thicket at the north end of the island. Date, 13th August.

Hæmatopus (niger) fuliginosus. Black Oyster-catcher.—Found on all the islands, but less frequent than the Pied variety (*H. longirostris*). I obtained several nests containing eggs. The nests were mere hollows in the sand, and, as a rule, were excavated a little above high water mark. The eggs were invariably two in number, and seemed, on the average, to be larger than those of the Pied species. I often had a difficulty to make the two species of Oyster-catchers come up to a nest and own their eggs. Usually both species were in sight. In one instance three Oyster-catchers' nests were close together. As well as these species, a pair of Long-billed Stone-Curlews was present. One pair of eggs presented a very unusual variety, being not unlike those of the Stone-Curlew (*Burhinus grallarius*), and I at first hoped they might belong to the larger species, but they were eventually owned by a Pied Oyster-catcher.

Hæmatopus longirostris. Pied Oyster-catcher.—Fairly common throughout the Archipelago. Pairs were nesting on most of the islands. I found nests both on the smooth, sandy shores and on small patches of sand in rocky hollows. The earliest clutch I obtained was one of three eggs on 10th July. These were slightly incubated, and exhibited the streaky variety of eggs of this species.

Esacus (Orthorhamphus) magnirostris. Long-billed Stone-Curlew.—Pairs of this fine species were found on several of the islands visited, but it was not common. Usually the parents were accompanied by a well-grown young bird, and in one case by a pair. Copious rains had fallen during the preceding March. This species had evidently bred soon afterwards. However, on revisiting the beach where I had found the colony of Caspian Terns breeding on 5th July, I observed a female bird of the present species quietly slipping down to the tide-line. I easily tracked her footprints back to a nest—a mere hollow in the sand, containing a single egg.

Ægialitis ruficapilla. Red-capped Dottrel.—A few pairs of this species frequented the beach near my camp on Barrow Island. I think they attempted to breed, as I found traces of nests and observed

the female in several instances running down to the adjacent mud-flat in a manner suggestive of a nesting bird. Unfortunately, the birds had selected a nesting-site where bandicoots abounded, and I think the latter in every case devoured the eggs.

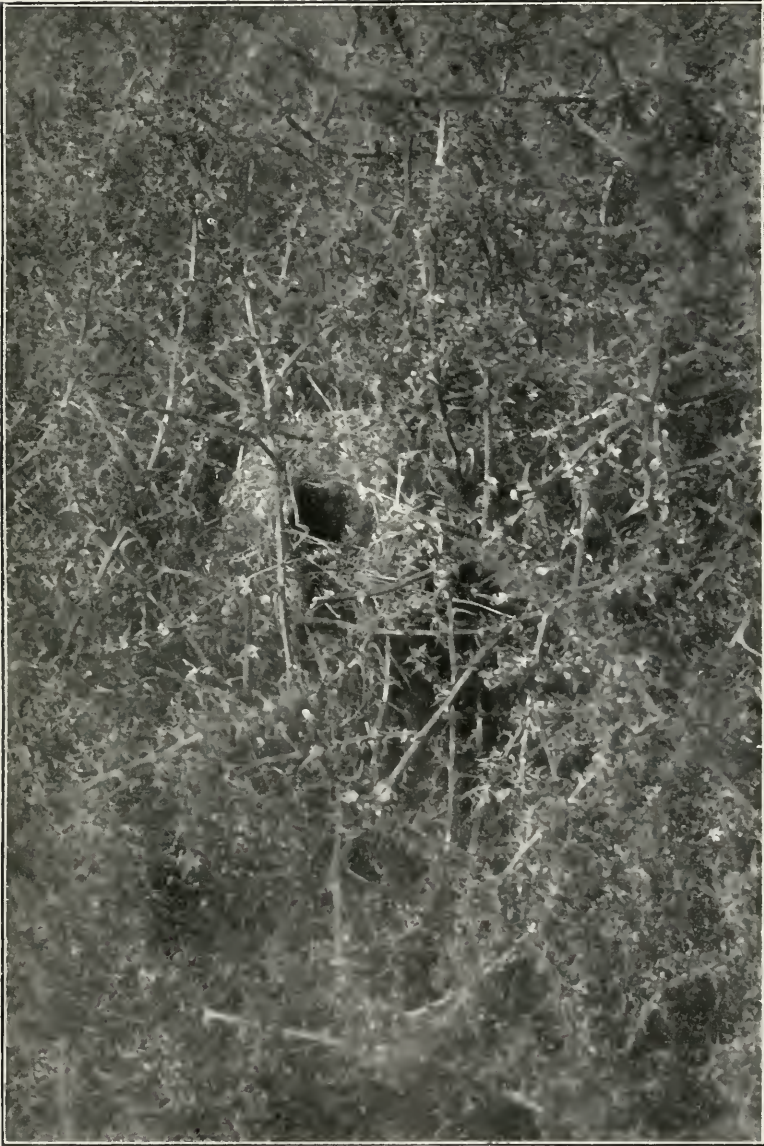
Geopelia humeralis. Barred-shouldered Dove.—Found on Barrow Island and the neighbouring Double Island. These "Mangrove Doves" were very common near my camp, and frequented both the mangroves and the large snake-wood bushes. A pair or two were nesting in a thicket of *Brachychiton* trees more in the interior of the island, and other pairs on a small islet clothed in part with mangroves, on the eastern side of the anchorage. The nests were poor structures of twigs and grasses, generally placed at a height of 3 or 4 feet from the ground. The eggs were two in number. One nest contained three eggs, but the third egg obviously belonged to another clutch. Incubation lasts three weeks. This Dove was the earliest land-bird to commence calling at daybreak. They often roosted just above my tent.

Anthus australis. "Barrow Island" Pipit.—This species was sparingly distributed over all those parts of Barrow Island I visited. It appears to be a lighter-coloured form of the mainland species, the dark centres to the feathers being ill-defined and paler. It is probably identical with a variety recently described by Mr. G. M. Mathews from the Montebello Group. I found two nests, each containing three eggs. They were both constructed outwardly of grasses and lined with a little wallaby fur. One was in a cavity of the rocky flooring of an islet; the other in a patch of heath-like plants growing just above high-tide line.

Ptilotis sonora. Singing Honey-eater.—Common wherever suitable cover existed on Barrow Island and Double Island, but absent from the smaller islands of the Archipelago. At the time of my visit it was breeding in a half-hearted manner, and I don't think I noted more than seven nests. They were in a variety of situations, usually without any attempt at concealment. I took eggs from a nest in the mangroves, and saw another, containing a single egg, attached to the leaves of a *Hibiscus* plant. The strong winds eventually capsized this nest. When a nest was abandoned it was invariably pulled to pieces and the material used in the construction of a new nest.

Tæniopygia castanotis. Chestnut-eared Finch.—I was surprised to meet with this Finch, which I had hitherto considered inseparable from fresh water. It was very uncommon, however, and I met only two small parties. I knew two were nesting near my camp, but for a long time they baffled me. At length I found the nest accidentally by observing the female fly from a bunch of seaweed attached to the extremity of a long mangrove branch. My boatman had actually fastened a mooring-rope to this limb without seeing the nest. The nest was merely an accidental cavity in the seaweed left by high tides; it was profusely lined with Doves' feathers, and contained five eggs, almost hatched.

Malurus edouardi. Barrow Island Pied-Wren.—To obtain information respecting the nesting habits of this Wren was one of the objects of my visit to Barrow Island. I had discovered its haunts during



Nest of *Malurus edouardi* in Prickly Bush, partly opened to take photograph.

my researches on the island the previous October. I landed this time much earlier in the year—viz., 15th July—and at once got to work. My first day in its haunts proved that pairs had commenced nesting some weeks previously. After a few hours' search near the tide-line amongst the innumerable tussocks of sea-grass (*Spinifex longifolius*) and the common harsh spinifex (*Triodia*), I found the remains of a nest recently torn out, also a nest containing newly-hatched young, and lastly a nest containing three fresh eggs.

The first nest had been placed right on the top of a very solid clump of spinifex, where it can hardly be said to have been concealed. The other two nests, on the contrary, were well hidden, and both placed two feet or so from the ground in masses of the less harsh but coarse *Spinifex longifolius*. The nest containing eggs was discovered by flushing the sitting bird; that containing young was found by close search, and through the materials of the nest not harmonizing with the grass surrounding it. Though I waited near for some time, and, as I thought, well concealed from view, neither of the parent birds ventured near the nest; but on rising to change my post of observation I caught sight of a male in nuptial plumage and two brown companions in a bush some 50 yards away. I subsequently found it the rule that whilst an intruder is near a nest the proprietors keep away, even should they be feeding the young. On the other hand, once the young have left the nest, but are still under the care of their parents, both male and female will come fearlessly within a few feet of the observer to convey food to their young concealed in the scrub near at hand. Under these circumstances, they take little flights vertically into the air, and until they find out the exact position of the enemy will not venture nearer. I watched young being fed under these conditions several times, but could never see what the parents were carrying. Probably it was small insects, as it was quite concealed in the closed bill. During the ensuing six weeks I saw much of the nesting habits of this species.

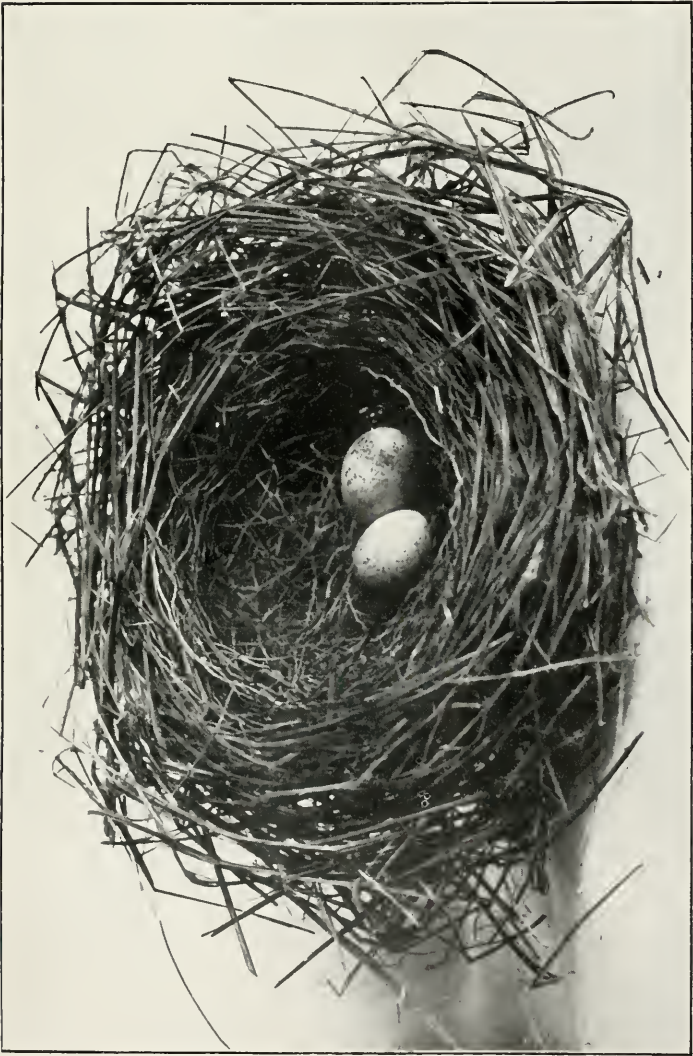
Other nests found were either in harsh spinifex (*Triodia*) or in the coarse sea-grass; but later on a very prickly herbaceous plant, with seeds like the well-known "double G," was selected. This plant also grows on the mainland, and in the Upper Coongan River district is resorted to by the Blue White-winged Wren (*M. cyanotus*) for nesting purposes. Nests built in this plant were not difficult to see, but every plant had to be examined. This was best done by stooping down on the opposite side to the filtering rays of sunlight. A nest on the top of a large clump of particularly harsh spinifex (*Triodia*) was very well concealed. When at some distance I thought I saw a "streak of brown" leave the clump and instantaneously disappear into cover. On reaching the clump I could for a minute or two make out nothing, and had it not been for a small piece of nesting material catching my eye I might have overlooked the nest. I found it was placed in a natural cavity in the spinifex, and so effectually was it hidden that only the entrance—which this time was right at the top—was visible. This nest contained newly-hatched young. Another nest was placed on the side of a large clump of spinifex. When found this was not quite completed, and on being visited a week later showed unmistakable signs of having been disturbed. I imagined the eggs had been devoured by a lizard or other plunderer. Judge of my surprise, on passing the nest several days later, to find it contained three fresh eggs, easily visible, in the tumbled state of the nest, without a close inspection. I had a similar ex-

perience with another nest built in the sea-grass, and am at a loss to account for the condition of these nests, which, happily, did not result in their abandonment by the owners. The Black-and-White Wren was still nesting when I left Barrow Island, though young birds had been on the wing quite six weeks previously. A nest I had under observation was commenced and completed, and the first egg laid, within nine days.

I have since met with what may be historically termed the original form of the Black-and-White Wren—viz., *Malurus leucopterus* (Quoy and Gaimard). This species was recently re-discovered in its original haunt, Dirk Hartog Island, Shark Bay, by no less experienced a field naturalist than Mr. Thos. Carter, M.B.O.U., formerly of this State. Mr. Carter has written a full account of his observations, which, however, were not conducted during the nesting period (see *Ibis*, 1917, pp. 593-597). I, too, was late for nests and eggs when I landed on Dirk Hartog Island, though I saw young only just able to fly. My visit to Dirk Hartog Island was brief, but I saw enough of the Black-and-White Wren to form the opinion that it is almost identical in its habits with *M. edouardi*. The character of its haunts differs greatly, however. Dirk Hartog may be described as an island thickly clothed with shrubs, bushes, and herbaceous plants, with little spinifex and few open spaces; Barrow Island, on the contrary, is an island of spinifex, with only isolated patches of low bush, except in very restricted localities where snake-wood and mangroves are found, and with large open valleys where bird-life is almost absent.

I found the flight of small birds, especially Wrens, much easier to follow with the eye on Dirk Hartog Island. This may be due both to the dark background of bushes and also to the absence of sun-glare, which is very trying on Barrow Island.

Eremiornis carteri. Desert-Bird.—Eggs of the Desert-Bird, or "Spinifex-Bird," as I prefer to call it, were another chief objective of my trip to Barrow Island. In the previous season I had failed in an attempt to obtain these eggs on the Upper Coongan. In that instance I was deceived by the parents carrying small sprays of a woolly-flowered shrub (*Trichinium*) into the spinifex (*Triodia*), to feed their young already hatched, when I thought they were only to be used as a lining to their nests. I was somewhat dismayed to find, soon after landing, pairs carrying food into the spinifex with the now—to me—familiar alarm notes. I feared I was this time too late for eggs. I was not long in locating a nest, having watched the parents carrying little moths, grubs, and other small objects into a particular circle of clumps of spinifex. Whilst I was cutting away the clump I suspected contained the nest, the young must have slipped out, as when I reached the nest it was empty. In passing I may mention that the young seem to remain in the nest until their long, broad tails are grown. This may account, perhaps, for the large and somewhat deep cup of the nest, which looks unnecessarily big to accommodate only two young birds. Two, I feel sure, is the usual number of eggs laid, though I do not doubt three may be occasionally found. It was not encouraging to find further pairs feeding young that had already left the nest. However, near my camp I became aware of another pair inhabiting a large patch of mingled *Triodia* and *Spinifex longifolius*, which, I felt sure, had not recently nested. The male in this instance called regularly at day-



Type Nest and Eggs of the Desert-Bird (*Everomys carteri*).
About two-thirds natural size.

PHOTO, BY SID. W. JACKSON, R.A.O.U.

break, and also during the day, and again in the evening till after sunset. After a few hours of watching and listening, I made certain he was accompanied by a mate, and that no early hatched young were with the pair. I determined, therefore, to keep a close watch without being too intrusive, with the idea of seeing if actual building operations were in progress. In this I totally failed. Not once, during observations extending over three weeks, did I surprise either parent carrying a single blade of dried grass. It was only after several systematic searches in the patch of *Spinifex longifolius* that I gave up hope of finding a nest in that easily examined grass. There remained small patches of *Triodia* amongst the *S. longifolius*, and also several larger patches near at hand. On one occasion I was standing in the middle of one of these latter, watching the male bird, which showed unmistakable signs of uneasiness. This was expressed by little flights into the air and a timid approach towards me. I did not stay long, but for the future paid particular attention to that patch of spinifex. On another occasion, in the dusk of the evening, I saw a Desert-Bird leave the same spot in a very furtive manner, but, of course, nothing could be seen of what was in the interior of the numerous clumps of spinifex. I was now fairly certain the nest was to be looked for in that particular patch. I decided to wait until a certain date. I fixed on 9th August, as a matter of fact, before commencing on the tedious operation of systematically cutting or tearing out each individual clump. For this purpose I had previously tried a long-handled billhook and a light axe, and found the latter the better weapon. I was armed also with a pair of driving gauntlets (gloves). These had been suggested by Mr. H. L. White as a substitute for hedge-cutters' mittens, which I had tried in vain to obtain. The gauntlets were a great comfort, and I was able to tackle the densest and most prickly clumps of spinifex without detriment to hands and arms. I had cut out some large masses before I tackled a succession of three smaller ones which actually touched one another. I demolished the first, and took a peep, as far as was possible, into the second before attacking it. I thought I could make out the rim of a nest. Cautiously opening out the top of the clump, I could distinctly see an apparently perfect nest of the Spinifex-Bird, but, alas! quite empty. I quickly restored all the surroundings to their former condition as near as I was able, and was about to leave the spot when, to my dismay, I noticed both the parent birds watching me from the lee of a large clump of *Triodia* not far away. I hurried off, hoping the birds would not desert the nest, but much perturbed about the matter, nevertheless. I decided not to make a close inspection of the nest for at least three days. This rule I followed till the eleventh day. In the meantime no eggs had been laid, and I was losing hope. On the eleventh day I got a pleasant surprise. The nest contained one egg. At 11 o'clock on the following day there were two. I did not expect more than a pair. I cautiously removed the eggs and played an old schoolboy trick on the female by substituting a pair of commoner eggs in their place. I had two objects in view: I wished to prevent the nest from being deserted in case there was a third egg to make a complete clutch, and I also wanted to learn something of the behaviour of the sitting bird. The ruse worked, as I saw the female slip off the nest on visiting it again the following evening. She did not, however, permit a near approach before doing so. She sat for two following days, but the time had arrived for me to leave Barrow Island, and

I wished to photograph the nest *in situ* if practicable. To do this necessitated opening out the top of the clump to enable a view to be obtained of the nest. This, in the long run, proved too much for the female, and she deserted the nest, which I removed a day or two later.

Nests of the Spinifex-Bird will always be most difficult to find, owing to the dense nature of the haunts it inhabits. A few hints, based on my own experiences, may be useful to some future field naturalist who may attempt the task. In the first place, provide gauntlets to cover the hands and wrists. I have torn the spinifex to pieces with bare hands, but this entails some suffering from the many minute punctures to the skin. The points of the spines are apt to break off and remain in the wounds, which become quite painful in consequence. To attack the large, harsh clumps, I think the best weapon of all would be a light pair of gardener's shears, kept very sharp. One could work rapidly with these and without the fear of accidentally damaging a nest, as might happen with an ill-directed blow from a light axe or billhook. A tomahawk is of no use. Having located a male, watch him and listen in an unobtrusive way for the presence of his mate. The male always calls at daybreak, and, unless it is very windy, at intervals during the day, and again in the evening till after sunset. He is not timid, and will call from any point of vantage. If the female is there she frequently adds to his call of "Je suis" three harsh grating notes like the syllables "jut-jut-jut," the interval between the second and third notes being shorter than that between the first and second. The female is much more secretive than the male until the young are being fed. Having located a pair, note, especially during the middle of the day, what particular part of the spinifex the male calls from the most frequently. I am of opinion the female does all the nest-building, and that the male calls from any point of vantage near to the nest. So far I have no evidence that the species builds in anything but the harsh, prickly spinifex (*Triodia*); but it occasionally happens that small bushes are surrounded by this grass, and a fork of such a bush might be used as a nesting-site, provided it was well hidden by the surrounding growth. In all, I have found but four nests, from three of which the young had flown. One was in a very large clump, two in rather smaller, and one in quite a small clump surrounding a slender bush. I must state that pairs are only found where the spinifex is of luxuriant growth, and not where a wide area presents a view of innumerable small clumps.

When one has formed a general idea as to the locality of the nest, commence the search by examining each clump for any opening sufficient to allow the entry of a small bird, and not too dense to furnish a cavity sufficient to contain the somewhat large and substantial nest. Avoid those matted clumps that will bear the weight of a 10-stone man. The rest is a matter of patient watching and persevering work with the shears. The nests I found were all higher than the centre of the clump. The base of the spinifex is usually too dense and matted to afford a nesting-site. The eggs of the Spinifex-Bird have been described by Mr. H. L. White. They show an affinity with those of *Megalurus* and also with those of the European Grasshopper-Warbler (*Locustella naevia*). The nest, too, though it differs from that of *Megalurus striatus*, is not unlike that of the Grasshopper-Warbler, being entirely composed of fine grasses, without any lining of fur or feather. The three species of birds,

again, show a strong family likeness, and all seem to haunt dense cover, in which they hide their nests. There is, however, a wide difference in their call-notes. This is especially marked in the case of the Grasshopper-Warbler. In flight the *Spinifex*-Bird seems much encumbered by its long, broad tail, which is not borne horizontally, but in a semi-drooping fashion. The flight is performed in a straight line, at a very low elevation, and in a feeble, fluttering manner, as though the bird was anxious at the first chance to drop into cover.

Puffinus sphenurus. Wedge-tailed Petrel.—This Petrel breeds on Fortescue Island, Round Island, and Double Island. The colony, however, on the latter locality is a comparatively small one. Fortescue Island is one of the larger islands of the Dampier Group, and so numerous are the burrows there that walking is somewhat painful, owing to the frequency with which the earth collapses underfoot. Round Island is, on the contrary, a very small island, and the overflowing Petrel population is driven to the shore, where I found pairs sheltering in burrows excavated under the innumerable slabs of sandstone thrown up by the heavy gales which not infrequently occur in these latitudes. I tried in vain to secure some of these birds by driving them out with a long stick. They either backed into some crevice, whence I could not dislodge them, or escaped through the burrow having a double outlet. We anchored all night near Round Island, and I had some difficulty in persuading my boatman that the sounds we heard were not people calling, but due to the Petrels. On Double Island, where I obtained eggs the previous November, some of the burrows were not so deep, and I managed to seize a pair of birds. They both bit and scratched savagely, and I tried in vain to put one in my collecting bag whilst I dealt with the other. I had perforce to let one bird go, as my hand was streaming with blood, and I could do nothing with the pair of them.

NOTE.—Judged by the large series of clutches of *Haliæetus leucogaster* (White-bellied Sea-Eagle) and *Pandion leucocephalus* (White-headed Osprey) sent in by Mr. Whitlock, eggs of the first-named from N.W. Australia are much rounder in shape than those of the eastern bird, while I have nothing from the east so highly coloured as the North-Western Pandion's eggs, some of them being of most brilliant shades. The bright coloration of the North-West eggs does not apply to a four-egg clutch secured at Dirk Hartog Island, which locality, however, cannot be termed in the North-West. One highly-coloured egg taken at Shoal Island, Dampier Group, from a nest containing also a young bird, has the ground colour a bright yellow shade, as if saturated with oil. I think the addled egg had been in contact with fish brought as food for the sitting bird or for the nestling.—HENRY L. WHITE. Belltrees, Seone, N.S.W., 11/3/19.

WE are glad to state that our friend, Mr. Tom Carter, M.B.O.U., has rejoined the Union. He left through some misunderstanding, which the Council very much regretted; but the matter has now been cleared up satisfactorily.

Further Notes on Additions to the "H. L. White Collection."

BY A. J. CAMPBELL, C.M.B.O.U., MELBOURNE.

(Continued from *Emu*, ante, p. 2.)

THERE is no abatement of Mr. H. L. White's enterprise to foster ornithological exploration. Last year he again commissioned Mr. F. Lawson Whitlock to visit the Dampier Archipelago, North-West Australia, and on the return journey to touch at Shark Bay district, including the historic island of Dirk Hartog.

The bird-skins collected are now in the "H. L. White Collection," National Museum, Melbourne, where, most fortunately, they can be examined by students. The specimens include a particularly fine series—indeed, the best extant—of the Black-and-White *Malurus*, from both Barrow and Dirk Hartog Islands—the only known habitats of these birds.

Mr. Whitlock's own account of the Dampier Archipelago appears in another part of this issue (pp. 240-253), while, regarding Dirk Hartog Island, he writes under date 16/11/18:—"I could not, for several reasons, remain on Dirk Hartog for any length of time, lack of communication with the mainland being one. I did not wish to be stranded there and miss the monthly boat going south. I was really too late for the best work when I landed on the island. The breeding season evidently commences there early—I should say about the end of June* in normal seasons.

"Dirk Hartog is clothed with innumerable bushes of many species. There is just room to walk around each clump, so you will easily realize it is a country requiring close and systematic search to do the thing thoroughly. Birds, for the most part, were in moult; they skulk under such circumstances.

"I saw one pair only of *Amytornis*, but, despite much time devoted, I could not get a shot. The strong winds are a difficulty in Shark Bay. They keep the climate wonderfully cool, but, once a bird takes to a big bush when the wind blows it is impossible to follow a bird with the eye.

"I worked the Peron Peninsula for three weeks, and secured *Malurus cyanotus*, two species of *Acanthiza*, &c., and fired at a venture at what I thought was an *Amytornis* just as it was disappearing into a bush, and was delighted to pick up a fine female. . . . Shark Bay requires a whole season to work the district thoroughly, the areas to be examined are so extensive."

Mr. Thomas Carter, M.B.O.U., contributed a valuable article to *The Ibis* for October, 1917, on "The Birds of Dirk Hartog Island and Peron Peninsula, Shark Bay, Western Australia,"† the result of two trips—April and May, and from October, 1916,

* When Mr. Otto Lipfert visited Bernier and Dorre Islands, 1910, he found that the breeding season for the smaller birds had finished about the end of May.—*Vide Emu*, xii., p. 287.

† Briefly noticed in *Emu*, ante, p. 60.

to January, 1917. The trips will be memorable for the re-discovery of Quoy and Gaimard's two long-lost species, *Malurus leucopterus* and *Anytornis textilis*, and the discovery of several new sub-species. These are dealt with in my critical remarks which follow. Mr. Carter's field-notes are of a high order, after the style of his "Birds Occurring in the Region of the North-West Cape" (four parts), which appeared in *The Emu*, 1903, vol. iii.

[Nomenclature according to the R.A.O.U. "Check-list" and Mathews's "List of the Birds of Australia"; colours after Ridgway's "Standards."]

Zonifer pectoralis, Cuvier. Black-breasted Plover.

Z. tricolor gwendolena.

Two ♀♀ from Dirk Hartog. Regarding this widely-distributed endemic Plover, Mr. Mathews claims that there is a south-western race which possesses a "different-shaped (larger) wattle and narrower black band on breast" than the eastern bird, and gives a figure in his "Birds of Australia," iii., pl. 131. The bird is named in honour of Amy Gwendoline Carter, daughter of Mr. Thomas Carter, M.B.O.U., who has spent a lifetime amongst the birds of Western Australia and discovered many new species.

Mr. Carter observed this species on Dirk Hartog Island on several occasions, but did not obtain examples. The two birds that Mr. Whitlock secured have general coloration of the back buffy-brown, nearer the hue of typical eastern birds, while the dimensions (mm.)—length 285, wing 195, tarsus 48, culmen 25—are practically those given for *gwendolena*.

Geopelia humeralis, Temminck. Barred-shouldered Dove.

Chrysauchena humeralis headlandi.

Two ♂♂, Barrow Island. Whitlock calls these "Mangrove-Doves." They are decidedly smaller in size and paler-coloured than typical birds from the East. Mathews's *headlandi* will distinguish the Western race.

Cerchneis (cenchroides) unicolor, Milligan. Western Kestrel.

One ♂, 1 ♀, Barrow Island. The male resembles *unicolor* (Milligan); the female resembles *milligani* (Mathews).

Cacatua (sanguinea) gymnopsis, Selater. Bare-eyed Cockatoo.

Ducorpsius sanguineus westralensis.

Two ♀♀, Dampier Group. With more material and the examination of a larger series it is necessary to add to my former note (*Emu*, ante, p. 7). When I stated that the island bird was "whiter" I meant "less soiled" than was the plumage of north-west mainland specimens. The whitest (pure white) birds are from the Northern Territory. If Gould's *sanguinea* be from Port Essington, Mathews can hardly hope to sustain his *distinctus* from Alligator Creek, practically the Port Essington region (Arnhem Land).

A large series of this Cockatoo from Arnhem Land in the National Museum, Melbourne, shows that the general plumage

is *pure white* (*sanguinea*), while the material, including the Dampier specimens from N.W. Australia, in the "H. L. White Collection" all has a *light ivory-yellow* tone (? *gymnopsis*).

Chalcococcyx basalis, Horsfield. Narrow-billed Bronze-Cuckoo.
Ncochalcites b. wyndhami.

One ♀, Barrow Island. Same as Cossack skin collected by Whitlock, 22/10/17. For Dirk Hartog Carter records *plugosus*, which separate species seems to favour more southern parts of the West.

Artamus leucogaster, Gould. White-rumped Wood-Swallow.
A. leucorhynchus harterti.

Two ♀♀, Barrow Island. Whitlock previously obtained a ♂ from Cossack. There is no appreciable difference in West from East birds.

Artamus cinereus, Gould. Grey-breasted Wood-Swallow.
Austrartamus melanops tregellasi.

One ♂, Dirk Hartog Island. Typical. For the last 75 years Gould's unsurpassable plate ("Birds of Australia," ii., No. 29) has existed over the name *Artamus cinereus* for this well-known species, with the following leading letterpress:—"Space between the bill and the eye, the fore part of the cheek, the chin, the upper and under tail coverts, jet black."

More recently Mathews (*Bull. B.O.C.*, xxvii., p. 100, 1911) re-describes the bird:—"Line over the forehead, lores, and a ring round the eyes, as well as the throat, rump, thighs, vent, and under tail coverts black, with the name *Austrartamus melanops tregellasi*."

Pœcilodryas (pulverulentus) cinereiceps, Hartert. Grey-headed Shrike-Robin.
Quoyornis leucurus cinereiceps.

A mature skin, but unsexed, from Cossack, which confirms the opinion (see *Emu*, ante, p. 7) that the two specimens previously collected by Whitlock were not adults, and that it is Hartert's *cinereiceps*. It has been found farther south, at North-West Cape, by Carter (*Emu*, iii., p. 91).

Melanodryas bicolor, Vigers and Horsfield. Hooded Robin.
M. cucullata westralensis.

One ♂, 2 ♀♀ (immature), Dirk Hartog Island. May be *westralensis* (Mathews), which differs from the more eastern race by "its smaller size." This also applies to *picata* (Gould). Wing of *westralensis*, 94 mm.; of *bicolor* (Victoria), 97 mm.; of *picata* (Northern Territory), 88 mm.

As Grant points out, the chief difference seems to be one of size, typical *bicolor* being distinctly largest.

Oreoica cristata, Lewin. Crested Bell-Bird.
O. c. westralensis.

One ♂ (immature), from Shark Bay, where it is numerous. Mr. Carter observed the insular bird of this species on Dirk Hartog

was altogether paler in colour, and named it *lloydi* (*Ibis*, 1917, p. 608). As various kinds of birds frequenting Kangaroo Island, off South Australia, are darker than those of the mainland generally, so it appears that some species found on Dirk Hartog Island, off the western coast, are much lighter in colour than those represented on the mainland opposite, notably, in addition to the Bell-Bird, the Emu-Wren, Scrub-Wren, Field-Wren, &c.

***Pachycephala melanura*, Gould.** Black-tailed Thickhead.

P. m. bynoei (Mathews, *A. A. R.*, iii., p. 137).

Two ♂♂, 3 ♀♀, Cossack. Whitlock had previously (1917) collected a mature female. The females have all the light yellow (lemon chrome) under tail coverts, which obviously separates them from those of *occidentalis* (Ramsay) in the south and from the true *melanura* in the north. The Cossack birds may even be considered a distinct species. However, Mathews has made it a sub-species of *melanura*, the females of which have, when mature, the full yellow breast of rich lemon chrome.

***Pachycephala lanioides*, Gould.** White-bellied Thickhead.

Alisterornis l. carnarvoni.

Two ♂♂, Cossack. For previous remarks on this fine species see *Emu*, *ante*, p. 7.

Gould originally procured a single male* of this Thickhead from the North-West Coast, remarking:—"It is a most robust and powerful bird, and may hereafter be made the type of a new genus." The new generic name, *Alisterornis*, has been proposed. Good; but suppose there be another Australian avine genus named *Alisteranus*, and yet another *Alisterus*? Are not these three similar names confusing?

On behalf of Mr. H. L. White I described the eggs (typical of the *Pachycephalæ*), giving copious and interesting field observations by the collector (Mr. F. L. Whitlock) in the mosquito-infested mangroves of Condon (see *Emu*, viii., p. 143). In the following volume of that journal (pl. vii.) will be found a most excellent photo-picture of the nest and eggs, by Mr. Sid. W. Jackson, R.A.O.U.

***Calamanthus campestris*, Gould.** Field-Wren.

Two ♂♂, 1 ♀, Dirk Hartog; 1 ♂, 2 ♀♀, mainland opposite. A useful series. Carter named the island form *hartogi* (*Bull. B.O.C.*, xxxvii., p. 6); but it answers to Mathews's *dorrei*, from the adjacent island of that name—"differs from *howei* (= *campestris* †) in having less red on the crown and being paler above" (*Nov. Zool.*, xviii., p. 337).

Mr. Carter likewise separated the mainland (Peron Peninsula) bird, naming it *peroni* (*Ibis*, 1917, p. 586). I think he will find,

* Mr. Robt. Hall, C.M.B.O.U., described the female from Derby, 1901, *Victorian Naturalist*, xviii., p. 30.

† *C. howei*, type locality Mallee, Vic., is well represented by Gould's figure of *campestris*, "Birds of Australia," iii., pl. 71.

on further examination, that it scarcely differs from *rubiginosus* (Campbell), his own discovery, some years ago, near Point Cloates, farther up the coast.

Ephthianura albifrons, Jardine and Selby. White-fronted Bush-Chat.

E. a. westralensis.

One ♂, adult, Dirk Hartog. Typical coloration, but slightly smaller in size. Wing 65 mm., tarsus 16 mm., as against an Eastern specimen—wing 69 mm., tarsus 18 mm. Carter observed both this species and *tricolor* (on one occasion) on the island.

Campephaga humeralis, Gould. White-shouldered Caterpillar-eater.

Lalage tricolor indistincta.

One ♂ (immature) from Barrow Island. As a sub-species, *indistincta* is not sufficiently convincing.

Eremiornis carteri, North. Desert-Bird.

E. c. assimilis.

One ♂, Barrow Island. With the seven skins (4 ♂♂ and 3 ♀♀) previously collected by Whitlock, there is a nice series of this rare and unique species. The insular specimens, compared with the mainland birds, appear smaller in size, have the bill larger, and have the head darker reddish-brown, while the whole plumage is slightly darker.

The first finding of the nest and eggs, new to science, is graphically related by the collector in another part of this issue; and the description of the nest and eggs, together with the description of those of the Black-and-White Wren of Barrow Island, both by Mr. H. L. White, will be found *ante*, pages 127, 128.

Acanthiza whitlocki, North. Whitlock Tit-Warbler.

A. albiventris whitlocki.

Two ♂♂, 2 ♀♀, Shark Bay. Mr. Whitlock himself was the discoverer of this species.* When collecting for Mr. H. L. White in the East Murchison district he sent three skins, which Mr. White, in turn, forwarded to the Australian Museum (see *Vict. Nat.*, xxvi., p. 55, 1909). In addition to the technical characteristics, Mr. North reported that "*Acanthiza whitlocki*, of which two adult males and an adult female were obtained, is more nearly allied to *A. apicalis*. From that species, however, it may be distinguished by its greyish-brown instead of olive-brown upper parts, rendering the rufous-brown upper tail coverts more conspicuous by its purer white under parts and the broader black sub-terminal band on the tail."

The Shark Bay examples appear answerable to this description excepting that the tail feathers and edges of the primaries of some specimens are more inclined to be reddish.

* His own field notes and photo. of the nest appear in *Emu*, ix., p. 198.

Neither Carter nor Whitlock observed any kind of *Acanthiza* on Dirk Hartog Island.

Acanthiza morgani (tenuirostris), Mathews. Short-billed Tit-Warbler.

A. iredalei iredalei.

One ♂, 4 ♀♀, Shark Bay. Whitlock's industry has supplied material of another farthest-west *Acanthiza*—*morgani*—which Western and Southern species seems to stretch across the continent and joins with F. E. Wilson's *winiamida*, obtained in the Mallee district of Victoria (*Emu*, xvi., p. 169)—a darker-coloured race.

Both *A. whitlocki* and *A. morgani* were secured on the Peron Peninsula. Mr. Whitlock is of opinion that many species of birds found on the peninsula move to and from the south according to the season.

Sericornis maculata, Gould. Spotted Scrub-Wren.

Three ♂♂, 3 ♀♀, 1 unsexed, Dirk Hartog; 1 ♂, 1 ♀, the Peron (mainland). The western Scrub-Wren seems to have a wide range, but has not been recorded further north than the Shark Bay district, where naturally it is lighter-coloured than typical birds from the south-west forest country. There appears no difference in specimens from either Dirk Hartog Island, Bernier Island (next but one northward to Dirk Hartog), and the mainland.

Ogilvie-Grant, in *Bull. B.O.C.*, xxiii., p. 72, named the Bernier bird *balstoni*, which was figured in *The Ibis*, 1909, pl. 9, fig. 1, while Carter separates the Hartog bird, naming it after the locality—*hartogi* (*Bull. B.O.C.*, xxxvii., p. 6). It appears that Grant's name, *balstoni*, and description will amply serve to distinguish the *Sericornis* in Shark Bay region, including the islands thereabouts.

Malurus cyanotus, Gould. White-winged Wren-Warbler.

Hallornis leuconotus exsul.

Three ♂♂ (one immature), Peron Peninsula, Shark Bay. These additions bring the material available of this species from various parts of Australia up to thirty-three specimens. For previous remarks see *Emu*, xvii., p. 167.

In Mr. Carter's excellent article in *The Ibis* (page 593) he draws attention to Gould's plates of *M. lamberti* and *M. leucopterus* (i.e., *cyanotus*), the females of which have been transposed. I think what Mr. Carter desires to emphasize is that the female of *lamberti* does not sufficiently show the reddish-brown lores and mark round the eye, which distinguishing features are absent in *cyanotus* and in the true *leucopterus*. Gould's letterpress, however, correctly describes the birds.

Malurus assimilis, North. Purple-backed Wren-Warbler.

Leggeornis lamberti occidentalis.

Five ♂♂, 2 ♀♀, Dirk Hartog and mainland (Peron Peninsula).

Previously (*Emu*, ante, p. 6) I mentioned that this extreme western race may be either Mathews's *mungi* or *occidentalis*. It is now stated to be the latter (see *Ibis*, 1917, p. 592). Specimens from Dirk Hartog and from the mainland do not differ; this was also observed by Carter, and is somewhat remarkable, seeing that Bernier birds (from next island but one to Dirk Hartog) are appreciably different, the male having a very distinct diva blue (darker on the cheeks), correctly shown in Grant's figure (*Ibis*, 1909, pl. ix., p. 676); while both male and female have darker blue tails than either Hartog or mainland birds.

Another fact: whereas *occidentalis* and *leucopterus* are found together on Hartog, *bernieri* is the sole *Malurus* on the island of that name.

Regarding Eastern and Western races of *assimilis*, Mathews says (*Nov. Zool.*, xviii., p. 360) that *occidentalis* combines the head coloration of *lamberti* with the back coloration of *assimilis*, to which may be added "lighter chestnut (Hay's russet) shoulders" of western birds. Another cross-check—typical *assimilis* has the forehead diva blue, similar to the Bernier bird, but has the shoulders darker chestnut (morocco red). See *Emu*, ii., pl. 10.

Malurus leucopterus, Quoy and Gaimard. Black-and-White Wren-Warbler.

Nesomalurus l. leucopterus.

Ten ♂♂, 2 ♀♀, 1 not sexed, Dirk Hartog Island; and 6 ♂ (2 immature), Barrow Island. Adding to my former remarks (*Emu*, xvii., pp. 177, 178), and after examining an excellent series (total 27) of skins of the Black-and-White Wrens from both Barrow and Dirk Hartog Islands (W.A.), there appears evidence to admit of two "climatic or geographical races" for the following two principal reasons:—

Firstly, on a visual examination, the Barrow Island bird, *edouardi*, seems a trifle more robust than the type locality (Dirk Hartog) bird, *leucopterus*; while the Barrow male appears to possess more white on its wings. The male *leucopterus* has the darker blue tail (deep, dull violaceous blue), corresponding with the colour of that of the Blue-and-White Wren (*M. cyanotus*) of the mainland. The tail of *edouardi* is a more greyish-violaceous blue. On the other hand, the female of *edouardi* almost resembles the colour (fawn) of the female Blue-and-White mainland bird, while the female of *leucopterus* is lighter (drab).

It may be also mentioned that the feathers of the lower part of the tibia of the male *leucopterus* are dusky grey, as in *cyanotus*, while the whole tibia of *edouardi* is black.

Secondly, Mr. Whitlock's field testimony:—"After studying the male series of *M. edouardi* and *M. leucopterus*, I am prepared to admit that individuals of the latter have a tendency to exhibit blue feathers (not indigo blue, as in other species) on the breast. When these are present the tail is a much brighter blue than the ordinary black-breasted specimens. In *edouardi* I never detected

these blue feathers, in all cases the plumage being velvety-black and the tail a dull grey-blue. Possibly the Black-and-White Wrens on both islands have evolved, by isolation and climatic causes, from a Blue-and-White form. Barrow Island being the more isolated, it may be hazarded that *edouardi* is the older form, and has lost the tendency to exhibit blue feathers." *

The foregoing favours Mr. Mathews's contention that the two insular forms of the Black-and-White Wren would prove to be sub-specifically distinct, and the matter thus stands:—(1) Mr. Tom Carter has re-discovered Quoy and Gaimard's long-lost *M. leucopterus* on Dirk Hartog Island (see description by Mathews, *Austral Avian Record*, iii., pp. 86, 87, together with coloured figures of both sexes); and (2) that *M. edouardi* (Campbell), described previously (1901) in the *Victorian Naturalist* (xvii., p. 203), and again recently in *The Emu* (xvii., p. 177), may be considered a geographic race or sub-species.

Mr. Whitlock's full field notes concerning *M. edouardi* are found in *The Emu*, xvii., p. 175, and his finding of the nest and eggs, as described by Mr. H. L. White, in *The Emu*, ante, p. 127. Mr. Carter's first finding of *M. leucopterus* is not without interest, and is abridged from *The Ibis*, 1917:—I landed on Dirk Hartog Island on 25th April, 1916. Taking a turn with a .410 gun round the vicinity of the station homestead next morning, a Wren that appeared blue-and-white, with some female and immature birds, was seen and followed some distance. A long shot at the male had no result, except an impression was formed that it was the wrong colour, which was doubtless caused by a glimpse of its blue tail, and also that blue-and-white Wrens had been observed on the Peron two days previously. As the manager, Mr. Lloyd, was going to the north end of the island next day with camels, taking rations for men at out-camps and windmills, he kindly offered to take me and a small outfit, and leave me to camp alone some days at the well surrounded by scrub at the north-east corner of the island. On 27th April we travelled about 26 miles without seeing anything especial in the bird line. The following day Mr. Lloyd (who was leading the string of camels, while I "tailed" them) pointed to a Wren with white shoulders perched on a bush some distance from the track. I dismounted, and followed the bird a long way before I secured it—a real Black-and-White Wren, and one of the main objects of the trip accomplished! The bird was exceedingly wild, and gave some idea of the difficulty to be experienced in obtaining more specimens. The males were invariably wild and difficult to approach, but the females and immature males could always be "chirped" up, often to within a yard, and would remain there, usually on the top of twigs of a small bush. It was useless attempting to "chirp" up an old male, but sometimes, when a party of females and young birds

* Dirk Hartog Island and Barrow Island are about 400 miles apart, the former being separated from the mainland by a passage barely a mile in width, while the latter island is 30 miles from the mainland.—A. J. C.

was intently watching me while listening to my "chirping," the male was seen lurking in the dense foliage of a neighbouring bush, but would not openly expose itself. A full-plumaged male is usually accompanied by a party of from six to ten females and young birds, and leads them away at high speed, necessitating hard running to keep them in sight. One or two birds keep dropping out of sight, and eventually one finds the whole party has vanished in the scrub. The elusive males are even wilder than those of *M. cyanotus*. The song of both species is very similar—a delicate musical "trilling"—but not so frequently uttered by the Black-and-White species.

The birds usually run over the ground with tails erect at a surprising speed, but they sometimes hop. They are very skilful in flying perpendicularly into the air from the summit of a bush and catching small insects on the wing.

Stipiturus (malachurus) hartogi, Carter (*Bull. B.O.C.*, xxxvii., p. 6; *Ibis*, 1917, pl. xi.)

Whitlock secured a female of this newly-discovered, light-coloured, insular form. Carter secured both sexes, which are well figured in the coloured plate mentioned. It will be observed that the Hartog Emu-Wren most resembles *westernensis* (Campbell), but is smaller, paler, and has the filamentary feathers of its tail broader.

We learn from Mr. Carter that the first bird procured was a male, which was creeping about in a small wattle-bush; date, 28th April, 1916. At another part of the island, low, thick scrub matted with creepers, and also patches of dwarf tea-tree, seemed full of these extremely unobtrusive little birds. They creep about in a mouse-like fashion, the only notes heard being a faint mouse-like squeak. They do not fly much, but when they do the flight is straight, with tail extended horizontally, and in the bright sunlight the tail feathers sometimes glisten, so that these tiny birds might be mistaken for large dragon-flies. By keeping quiet one can readily watch them, and they can be "chirped" close up, but do not come out much from the actual shelter of the bushes. The male birds always appeared the bolder and more inquisitive.

Mr. Carter states that the sub-species (*hartogi*) is "quite distinct" from *ruficeps*. May they not be separate species? (Compare *Ibis*, 1899, pl. vii., and *Ibis*, 1917, pl. xi.)

Amytornis textilis, Quoy and Gaimard. Grass-Wren.
Diaphorillas t. textilis.

Mr. Carter's second re-discovery (a single ♂) was this other long-lost bird. Mr. Whitlock also obtained a single specimen, fortunately the opposite sex. It was a fortunate "snapshot," because it was the only specimen of the kind he saw on the Peron. Therefore, after the lapse of a century, it took two good field naturalists to collect a pair of birds, and so establish a long-lost species.

The following is Mr. Carter's account (*Ibis*, 1917, p. 605):—

"One specimen only of the Grass-Wren was procured on Peron Peninsula, though it is believed that others were seen. When a glimpse of a *Calamanthus* is obtained as it goes at full speed on the ground through scrub, it can easily be mistaken for a Grass-Wren, as the Field-Wren (*Calamanthus*) has very long legs for its size.

"On 3rd January, 1917, after having seen and chased a Grass-Wren for seven consecutive days at the same locality on the Peron, it (or another) was shot. It was always seen in the scrub from three to five feet high, and was exceedingly wild, usually only a distant glimpse of it being seen. On this particular day it was flushed in low scrub, and at once it ran off at great speed. I 'chirped' with my lips, and as the bird was running away it partially spread and drooped its wings and puffed out its feathers until it reached the shelter of a good-sized bush, below which it was only partly visible. A shot was chanced through intervening twigs, and it was killed. It was a male, with large testes. The general plumage was darker in shade and with rather bolder stripe-marks than birds from Dirk Hartog. The centre of the abdomen was white, which marking was not observed on any of the Dirk Hartog specimens."

Dimensions in mm.—length 170, wing 65, tail 90.

Whitlock's skin is not unlike Gould's plate (No. 28, vol. iii., "Birds of Australia"), which is slightly richer and darker coloured, and the skin, being a female, shows the chestnut-marked sides. Dimensions in mm.—length 160, wing 60, tail 80, tarsus 26, culmen 13.

Mathews considers the Dirk Hartog bird is sub-specifically separate, naming it *carteri* in the *Austral Avian Record*, iii., p. 87, with a fine coloured plate.

In view of the discovery of typical *Amytornis textilis*, it may be interesting to review its distribution, as was done with *A. striata* (see coloured plate and accompanying letterpress, *Emu*, ante, p. 81). Gould claims to have observed the Textile Wren on the plains bordering the Lower Namoi (New South Wales), where it was very abundant; but from his plate (above cited) it does not appear that he figured the Eastern bird, which students will agree is North's race, *modesta*.* Therefore, the distribution in general as given in the "Check-list" (p. 79) is correct—namely, *textilis*, "W. and Central Australia"; *modesta*, "New South Wales, S. and Central Australia."

Zosterops gouldi, Bonaparte. Grey-backed White-eye.

Zosterops (lutea) balstoni, Grant. Carnarvon White-eye.

One ♂ and 2 ♀♀ of the former were obtained on Dirk Hartog, while a similar number and sexes of this the more yellow

* See also "Nests and Eggs" (North), i., p. 250. And with which Mathews's *inexpectatus*, habitat New South Wales, appears synonymous.

and Northern species were taken on Barrow Island, which localities are nearly 400 miles (statute) apart in a direct line. The two species would appear to meet between the Gascoyne and Ashburton Rivers. At Point Cloates * Mr. Carter observed *gouldi* occasionally, but in the dense cover of the Gascoyne it was abundant, while *balstoni* was a common winter visitor to the coastal hill thickets. Mr. Carter is of opinion that the yellow species bred in the mangroves in the region of the North-West Cape, while Mr. Whitlock obtained an immature female specimen at Cossack; date, 10/9/18.

Ptilotis sonora, Gould. Singing Honey-eater.

Dorothina v. virescens.

Four ♂♂, 2 ♀♀, variously from Barrow Island, Dirk Hartog Island, and the mainland, all of which specimens are visually inseparable. Ogilvie-Grant treated the Bernier Island bird as typical *sonora*. See also previous remarks in *Emu*, ante, p. 5.

Mr. Carter's field observations are (*Ibis*, 1917, p. 609):—"The large size and bold markings of the birds on Dirk Hartog Island attracted my attention at the homestead immediately on arrival. Specimens from Dirk Hartog and the Peron average one inch longer in total measurement than birds from Carnarvon or Point Cloates districts. They are also much darker in the general colour of the mantle and under parts, and the black, yellow, and white stripes behind the eyes are larger and brighter in colour. Their habits and notes are the same as those from other localities. All the scrub of the island swarmed with recently-fledged young and their parents in October, and their noisy presence distracted attention when searching for Grass-Wrens" (*Amytornis*).

Glyciphila ocellaris, Gould. Brown Honey-eater.

Stigmatops indistincta perplexa.

One ♀ taken on Dirk Hartog. Mr. Carter did not meet with the species there. For further remarks on range, &c., see *Emu*, xviii., p. 5.

Acanthogenys rufogularis, Gould. Spiny-checked Honey-eater.

A. r. flavacanthus.

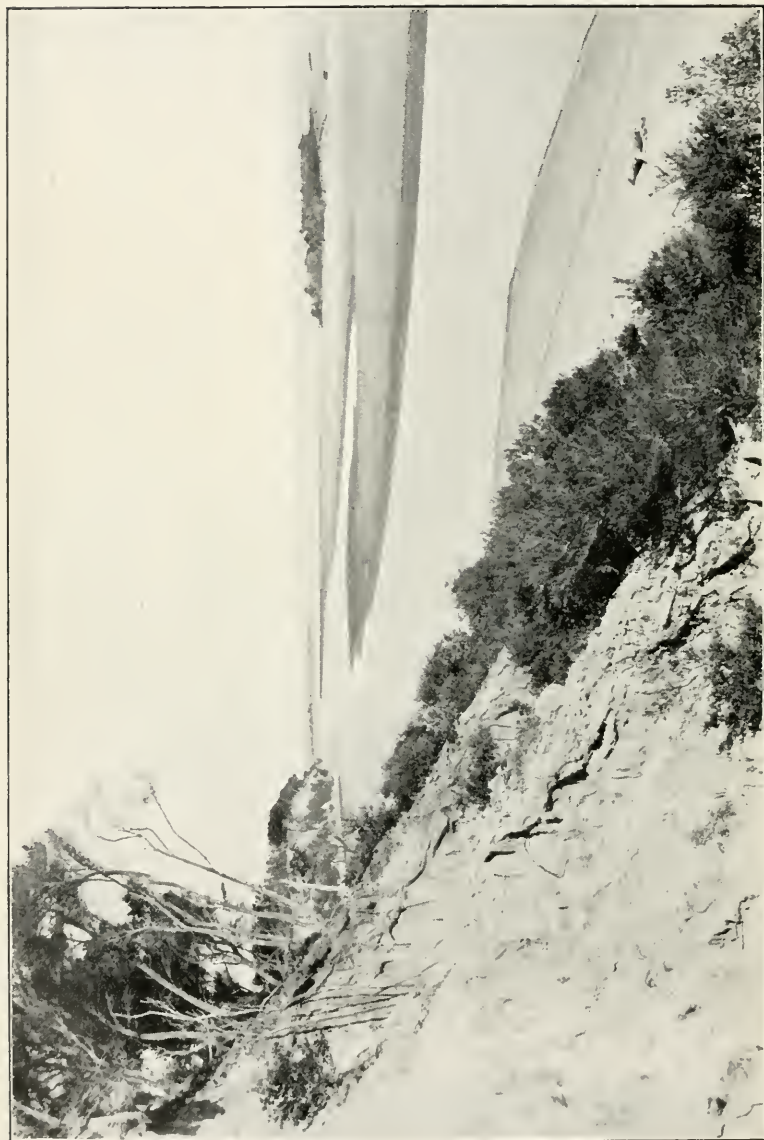
One ♀ from Barrow Island—a good northern range. The collector's label bears the word "stray." Western birds are slightly smaller (wing 107 mm.) than typical or Eastern ones (wing 113 mm.)

Anthus australis, Vigors and Horsfield. Pipit (Ground-Lark).

Austranthus australis.

On account of the variable colour of its plumage, the *Anthus* is always puzzling. Whitlock collected three specimens (1 ♂, 2 ♀♀) each from both Dirk Hartog and Barrow Islands. Carter believed there was sub-specific difference in the former birds, and named them *hartogi* (*Ibis*, 1917, p. 610); but a pair from Kow

* Carter, "Birds Occurring in the Region of N.W. Cape," *Emu*, iii., p. 91.



The Mouth of the Snowy River and Drifted Sand Beach.

PHOTO. BY TOM TREGELLAS, R.A.O.U.

Plains, Victoria, can hardly be separated from *hartogi*, and with same wing (82 mm.) Ogilvie-Grant did not recognize any difference in the Bernier Island bird to the common *Anthus*.

The Barrow birds are, however, redder in colour—more like the tone of *Mirafra woodwardi* from Cossack and contiguous mainland—and most resemble *subrufus* (Mathews). *A. montebelli* (Mathews), from Montebello Islands, near Barrow, is, no doubt, similar to the Barrow bird, and consequently also to *subrufus*, which race is shown as the "Rufous Pipit" for N.W. Australia on the R.A.O.U. "Check-list," p. 105.

Tæniopygia castanotis, Gould. Chestnut-eared Finch.

T. c. wayensis.

Two ♂♂, 2 ♀♀ (more or less in immature plumage), from Barrow Island. During Mr. Carter's visit to Dirk Hartog and the immediate mainland he found this far-distributed species abundant. The Barrow Island bird seems to agree with *wayensis*, which appears to be a light-coloured race with bill "vermilion" instead of "orange," as in typical birds (Mathews). Gould gives the colour of the bill "reddish-orange" for typical birds.

"Down Marlo Way."

BEING THE ACCOUNT OF A TRIP TAKEN BY DR. BROOKE NICHOLLS,
F. NICHOLLS, W. B. ALEXANDER, AND TOM TREGELLAS.

THE party left Melbourne early on a very hot morning, and after an oppressive journey, the last part of which was through bush fires, arrived at Orbost, the terminus of the Gippsland railway, at 9.30 p.m. The 10-mile run by motor along the banks of the Snowy River to Marlo, with our big headlights flashing on the recumbent cattle and horses by the roadside, with rabbits scuttling for their burrows by the river, and big moths and beetles dashing themselves to death on our wind-shield, was a ride long to be remembered. A refreshing dip in the river in the dark before turning in, and a cool change working up from the south during the night, soon restored our energies, and next morning we were ready to start exploring the locality.

Marlo (aboriginal for "white earth") is situated on a cliff overlooking the estuary of the Snowy River, between which and the sea stretches the long line of sand-dunes behind the Ninety-Mile Beach. Looking from the highest of these dunes, a wonderful view is obtained. Close at hand, and almost at one's feet, lie the lagoons, in which, according to the tourist map, "bream, perch, and ludrick" teem. A little to the right is seen the township of Marlo, across the estuary where "bream, salmon, skipjacks, silvers, trevalli, and yellowtail" are obtained. On quiet evenings great numbers of fish, chiefly mullet, are seen along the backwaters, jumping out of the water and gambolling in the

shallows. Further inland is the wonderful system of backwater, river, and lagoon. The junction of the Snowy and Brodribb Rivers, Stirling's Lagoon and Shag Creek, the islands that gem the waters, Lakes Corringale, Watt-watt, and Curlip, the intake of the Cabbage-tree Creek, and the nine-mile limit of the tidal influence, are all brought under subjection. One is lost in wonder at Nature's prodigality, and when the glorious sunsets that so frequently occur add their charm to the scene it is felt that here indeed is the abode of peace.

In the gullies among the dunes the first bird seen was the Pilot-Bird (*Pycnoptilus floccosus*), running under the fallen tea-tree (*Leptospermum laevigatum*) and currant-bush (*Styphelia richiei*). Its note differed somewhat from that of the Fern-tree Gully bird. The Coachwhip-Bird was also in evidence here as well as in the bracken close to the township. Along the dunes the silvery-foliaged white everlasting (*Helichrysum leucopsidium*) was found in patches, and lower down the fleshy-leaved yellow aster (*Senecio spathulatus*) graced the surroundings.

Marlo is the place *par excellence* for studying the conditions which produce these immense piles of drifting sand. Such is the influence of the wind and tides, especially after a hard blow or spell of stormy weather, that frequently the whole foreshore undergoes a change. At one place on the Ninety-Mile Beach a small stream of fresh water ran trickling to the sea; but in less than a fortnight a big blow not only piled up the drifting sand, but completely blocked the waterway to a height of 20 feet, and dammed back the water for a distance of 200 yards. When we were there a pair of Teal, a Black Duck, and a Cormorant were already disporting themselves in the pool.

The mouth of the Snowy River itself is altered in the same way. When the sand blocks the entrance (as it did in 1910), the river rises and the water overflows the banks; following the line of least resistance, it created a new entrance almost opposite to Marlo. The old course of the river to the eastward remains as a fine backwater, extending between the cliffs and the sand-hills for nearly 5 miles, almost to the rocky Point Ricardo, with an average width of 200 yards. Here and there along the sand tea-tree, currant-bush, and cushion-bush have established themselves, and marram-grass is fulfilling its function of binding up the drifts.

On the points and headlands of these sands great numbers of water-loving birds assemble. Hooded and Red-capped Dotterels and Pied Oyster-catchers patrol them; every submerged bank has its quota of Black Duck and Teal; Cormorants and Darters ply ceaselessly to and fro, and Gulls and Terns circle overhead. Curlews cry plaintively along the muddy margins of the river, the barking of the Little Penguin is heard further out, and at dusk long lines of Black Swan "honk" their way to their feeding-grounds. The presence of Darters (*Plotus novæ-hollandiæ*) is specially worthy of remark. These strange birds, with their



Blue-bellied Lorikeets on fruit tree at Marlo.

PHOTO. BY TOM TREGELLAS, R.A.O.U.

long, snaky necks, were, we were informed, newcomers to the district this season—a remarkable fact considering its suitability to their requirements. At all events, they were very much at home. There were dozens, if not hundreds of them, to be seen along the rivers and down the backwater. Sitting in the limbs of the dead trees along the river banks, craning their serpentine necks about, they look strange enough; but perhaps they seemed even more grotesque squatting on the sand-hills with their wings spread out in the sun to dry, and, when disturbed, waddling clumsily to the water's edge. Once in the water, however, all clumsiness disappears. Of the Cormorants, the Large Black, Little Black, and Little Black-and-White were all plentiful; the Pied was comparatively uncommon. The only Gulls seen were Silver Gulls, whilst Caspian, Crested, and Little Terns were all frequent. The only visiting Waders, the Sea Curlews, were very numerous; otherwise, the inhabitants of these waterways were all Australian natives. In addition to those already mentioned, White-faced Herons and Spur-winged Plover were common, and Black-fronted Dottrels were seen on one occasion. Coots and Hoary-headed Grebes showed themselves occasionally, and once a glimpse of a small Crake (possibly a Spotless Crake) was obtained before it vanished amongst the reeds.

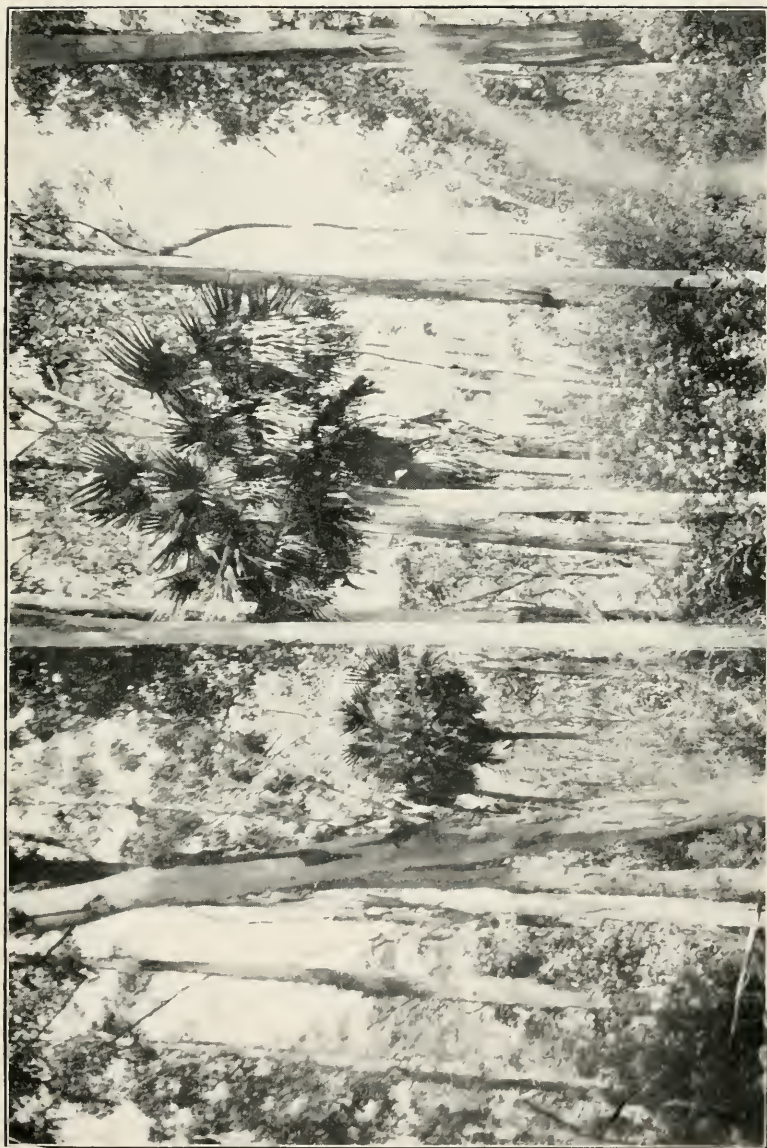
Up the Brodribb River to Lake Curlip, a distance of 8 miles by motor launch, was a lovely outing. For the greater part of the way the river is fringed by a bank of reeds (*Phragmites communis*), and almost to the water's edge in the lower reaches grew boobialla (*Myoporum floribundum*), lilly-pilly (*Eugenia smithii*), blackwood (*Acacia melanoxylon*), musk (*Olearia argophylla*), *Pittosporum*, and numerous other trees and shrubs, the whole bound together by garlands of seeding *Clematis* and *Tecoma*. This jungle type of country is quite distinct from the more usual open eucalypt forest, and doubtless harbours a distinctive fauna, though our stay was not long enough to reveal this. We were told of visits to it, when the fruits are ripe, by Wonga and Topknot Pigeons and flying foxes, but we saw none of these.

In the fine gum-trees along the banks several pairs of Whistling-Eagles had their headquarters, whilst Nankeen Night-Herons often flew out from them on our approach. Reed-Warblers were plentiful in the reeds, and over the more open country Gould's Harriers were constantly circling. The monarch of the bird world appeared to be a fine White-bellied Sea-Eagle, which ranged over all the waterways. On one occasion, on the Brodribb, we were fortunate enough to see a Grey Falcon. An interesting inhabitant of the district, occasionally seen sprawling on boughs overhanging the water, is the large water-lizard (*Physignathus lesueuri*), commonly known in the district as the "Snowy River alligator."

Soon after our arrival we heard that numbers of Parrots were feeding in an orchard close to the township, and a visit to the spot revealed the presence of some 150 Blue-bellied Lorikeets.

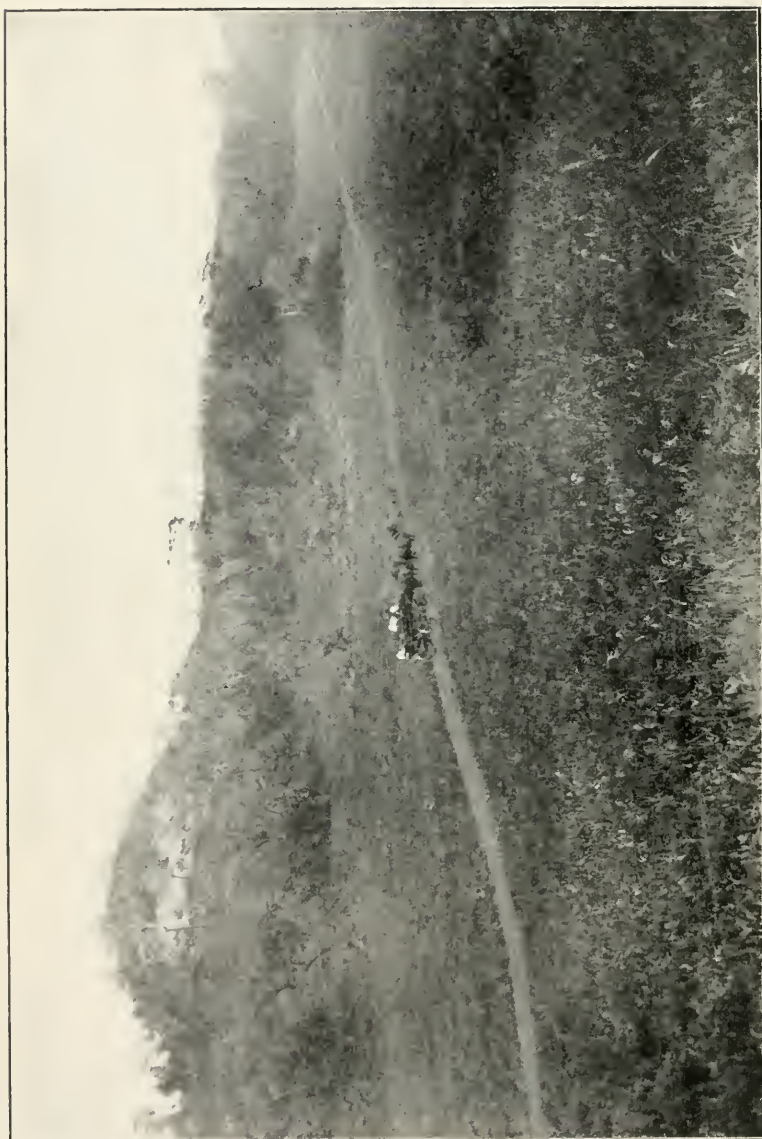
Their incessant screeching could be heard at some distance, and they were so tame that we could sit amongst the trees and study their habits at our leisure. The mass of gaudy colouring—each bird a colour scheme in blue, red, yellow, and green—the constant movement and chattering, the spiteful attacks and quarrelsome family life of a bird community, made a never-to-be-forgotten scene. Every few moments a noisy flock of new arrivals would come screeching down and settle in the low fruit-trees till the boughs bent under the weight of their gaudy burden. Clambering about among the foliage, they would peck at the fruit until it dropped to the ground, when they would follow and join their fellows who were already in the long grass feeding upon the fallen fruit. They seemed to prefer the apples partly eaten on previous days. These had fermented upon exposure to the sun and rain, and seemed much to their taste. Three of the birds, overcome by the strength of the naturally distilled cider, were caught by hand by a girl living close by, and placed in a cage, where they seemed perfectly contented and quite tame from the outset. Unfortunately, various accidents with the camera prevented our photographer from obtaining photographs when the revels were at their height. The birds, too, seemed much more suspicious of the camera than of human beings, even when the latter were armed with guns. A party of holiday shooters arrived a few days later, and much slaughter followed, the surviving birds dispersing through the bush to their natural food in the flowering banksias. The photograph reproduced gives a faint idea of the beauties of the scene in the orchard.

A most interesting trip was made one day to the Cabbage-tree Creek. We drove about 10 miles through most interesting country, beset with swampy areas that held Quail and Grass-Birds and was surrounded by timber consisting chiefly of mahogany gum (*Eucalyptus botryoides*) and messmate (*E. obliqua*). The creek is a comparatively small stream, which meanders through a serpentine course amongst wattles (*Acacia dealbata*), lilly-pilly, hazel, musk, dog-wood, and tree-ferns, in places festooned with the climbing vine *Eustrephus brownii*. From this jungle, somewhat similar in character to that on the river banks already referred to, rise fine eucalyptus trees with buttressed stems and numerous tall, graceful cabbage palms (*Livistonia australis*); the latter are the only trees of their species found in Victoria, and extend along the creek for about a mile. How did they get here? Are they the last relics of a vegetation surviving from a warmer epoch? Did aborigines bring the seeds from farther north in New South Wales, or were they perhaps conveyed by birds? Probably we shall never know. At all events, it is satisfactory to learn that the Government has declared the locality a reserve, and that young plants are still springing up along the creek. Some of the mature trees rear their heads to a height of 60 or 80 feet, and are probably at least 200 years old. One has been almost burnt through by fire, but its lofty crown is still as green



Cabbage-tree Palms near Marlo, East Gippsland.

PHOTO. BY TOM TREGELLAS, R.A.O. U.



The Road from Marlo east to Cape Conran.
Inside the high sand-dunes, in "heathy" country, Grass-Parrots are found.

as any of them. Many were producing flower-spikes, and fruits were to be found on the ground below. Probably this jungle too has its distinctive fauna, but the birds met with were the same as those found elsewhere. The loud song of the Lyre-Bird was heard amongst the tree-ferns; Thickheads were melodious in the trees; Tree-creepers were running up the lofty gum-trees; and the call of the Oriole was heard overhead. The creek itself, the haunt of blackfish, whose banks were green with masses of maiden-hair fern, was patrolled by the Sacred Kingfisher, whilst White-shafted Fantails snapped up the all-too-numerous mosquitoes.

For some few miles inland from the coast eastward of Marlo the country is more or less open, stretches of heathy country prevailing, interspersed with open forest, in parts of which eucalypts predominate, whilst in other parts, especially towards the edge of the sea-cliffs, Banksias are the prevailing trees. The banksias, which extend for miles along the Victorian coast-line, are one of the chief sources of food supply for many of our smaller honey-loving Passerines, as well as a few Parrots. Amongst them we frequently saw the Blue-bellied Lorikeets, whose brush tongues are doubtless extremely useful amongst the stiff, comb-like stamens of the flowering cones. The noisy Brush Wattle-Bird and the Crescent and New Holland Honey-eaters were constantly flushed in company with the Lorikeets. The cliffs themselves are in many places fairly thickly clothed with bushes and a variety of trees, and where streams come down from above miniature tree-fern gullies are to be found, the ferns growing to within 20 yards of the salt water. These localities were specially favoured by White-eared and Yellow-faced Honey-eaters, Tits, Scarlet-breasted Robins, and Scrub-Wrens.

But perhaps the birds of the open heathy tracts are the most interesting of all, and several days were devoted to tramping over those in the neighbourhood of Marlo, whilst on the longest of our outings—that to Cape Conran—we drove through miles of undulating country mainly covered with vegetation of this type. The plants met with, and which go to form the tangled heathy mass, included dwarf banksias, dwarf sheoaks (*Casuarina quadrivalvis*), native red fuchsia (*Correa speciosa*), the purple creeper (*Glycine clandestina*), yellow and brown broom (*Sphaerolobium viminalis*), Black-eyed Susan (*Tetralitheca ciliata*), a small *Pimelea* (*P. spathulata*), a *Dampiera* (*D. brownii*), a lavender-foliaged *Scævola* (*S. hookeri*), a fine *Pimelea*-like *Trachymene* (*T. billardieri*), a heathy *Brachyloma* (*B. daphnoides*), purple *Come-sperma* (*C. ericinum*), a pale yellow *Gompholobium* (*G. huegelii*), native furze (*Hakea ulicina*), red bottle-brush (*Callistemon lanceolatus*), a *Platylobium* (*P. obtusangulatum*), heath (*Epacris impressa*), dodder laurel (*Cassytha melantha*), lilies (*Stypanandra caspitosa* and *Dianella longifolia*), and the familiar bracken. These flowers and shrubs intermingled to such an extent that for hundreds of yards no bare ground was to be seen. In more swampy places dwarf

grass-tree (*Xanthorrhœa australis*) replaced most of the other shrubs.

This country was the special home of Emu-Wrens, Grass-Birds (*Megalurus gramineus*), and Ground-Wrens (*Hylacola*), all of which were very numerous. Stubble-Quail were also frequently flushed, and, most interesting of all, the Ground-Parrot (*Pezoporus terrestris*) was found to be by no means scarce. This rare Parrot is a dainty dark-green-coloured bird, marked all over the head and body with a pattern of vertical stripes or lines of black, its general tint thus harmonizing wonderfully well with its surroundings. When flying past at close range the yellow stripes on wings and tail can be seen. On the ground it is difficult to pick out a bird. One watched us from a distance of 20 feet; all that was visible was the head and neck and an alert black eye. The green and black stripes on the side of the neck looked exactly like the short, green, needle-like leaves of the dwarf *Banksia* or sheoak. In such country the bird is well camouflaged. When flushed the Parrot flies as fast as a Quail, and makes a sweeping flight, usually alighting 50 to 100 yards away. It never alights in a bush or sapling, often flying over them when disturbed until it finds an open space on which to settle down again. Of the numerous birds seen by us, not one uttered any call or note of any kind, even a wounded bird remaining quiet when handled.

The Marlo plains, the home of this Parrot, have a beauty all their own. The road to Cape Conran runs along the crest of the ridge parallel to the sea for many miles; yet, though the country has a general similarity, it is by no means wanting in variety. Over the open stretches the Spine-tailed Swifts seemed to enjoy chasing and circling at top speed, whilst the more homely Wood-Swallows also found the heath a good hunting-ground for insects. Unlike the more-travelled Swift, the Wood-Swallow does not scorn to settle in a tree from which to watch for his prey.

Driving home through this country in the first of the dusk, we flushed a Ground-Parrot. As it flew away an inquisitive Swift gave chase, and the Parrot held its own for a short distance. A light drizzle had set in, and the Swifts were flying low. The sun, sinking through the rain squall, flooded the plains with a silvery shimmer of light. Inland the low scrub and bushes were wrapped in the soft grey of twilight, whilst oceanwards the end of the sunset merged into two broad bands of blue and gold where sea and sky met. Seen under such conditions of failing light and gathering storm, this wild, wide-stretching country seemed to us an ideal home for so anomalous a bird as a silent, ground-dwelling Parrot.

Every mile or two the road dips deep into valleys separated from the sea by a single line of sand-dunes, and in one secluded spot we surprised three great grey kangaroos and a dingo. The reptile world is also represented here. Black snakes were not uncommon; one killed and opened up contained in its stomach nothing but water and a few frogs' limb-bones. A large goanna

(*Varanus varius*) ran up a tall gum-tree on our approach. By throwing sticks at him he was induced to climb higher and higher, until he finally climbed right out on to the leafy canopy at the top of the tree, where he lay sprawling out, swaying in the breeze, but practically hidden from his enemies below. It would indeed need ingenuity to find a place for a bird's nest that would be safe from a robber with such powers of climbing.

In certain parts the commonest bird is the Emu-Wren. In the short, close-set bushes its peculiar chirp-like single note would call apparently at one's feet. Next moment it would sound a few yards in front, behind, or to right or left, so hard was it to locate. The birds were difficult to see, but occasionally they would break cover to perch on the dry twigs of some fire-swept bush, when a view of them was obtained. Their flight was always very short and jerky, and their long tails seemed to hinder and pull them down. They looked more like insects than birds; most like large-winged locusts or grasshoppers with long legs dangling awkwardly behind. It is a constant wonder how they manage to manipulate their long, fragile tail-feathers amongst the tangled vegetation without breaking them.

Cape Conran—to which this narrative has set out more than once, but each time has become absorbed in the intervening country—is worthy of some account in conclusion. It consists of huge masses of weathered granite, and is sheltered on the landward side by clumps of tea-trees and native currant. On the uplands back from the cape are found numerous warrens of dusky-footed bush-rats (*Epimys fuscipes*), well-defined narrow tracks leading from one warren to another. Just behind the camping-ground, and close to the spring of fresh water, is a blackfellows' kitchen midden, in which various flakes and bones were picked out amongst the piles of broken shells.

The rock pools, with their numerous crevices and overhanging ledges overgrown with kelp, are the home of plentiful crayfishes (*Jasus lalandii*). At low tide a lump of shark or a dead Cormorant let down into the pool soon tempts the crayfish out, when it is cautiously hauled up and secured in a landing-net. Over 100 large crayfish were caught in this fashion in one large pool during the two days we spent at the cape. The big rollers from the sea continually swirl and roar through the rock openings, and with each successive rise the kelp and seaweed sway with the motion, and one has to watch one's chance of a crayfish. The weedy rock pools are also the haunts of sharks, rock-fish, and conger eels.

These are some of the memories and impressions of our visit to Marlo. No attempt has been made to give a chronological account of our doings, and our stay was all too brief to allow of our giving a comprehensive account of the bird-life of the region. The varied types of environment, each with its special inhabitants, deserve a wider and more prolonged study, but their diversity is shown by the fact that in a fortnight we were able to identify almost 100 species of birds. Many of these have been already

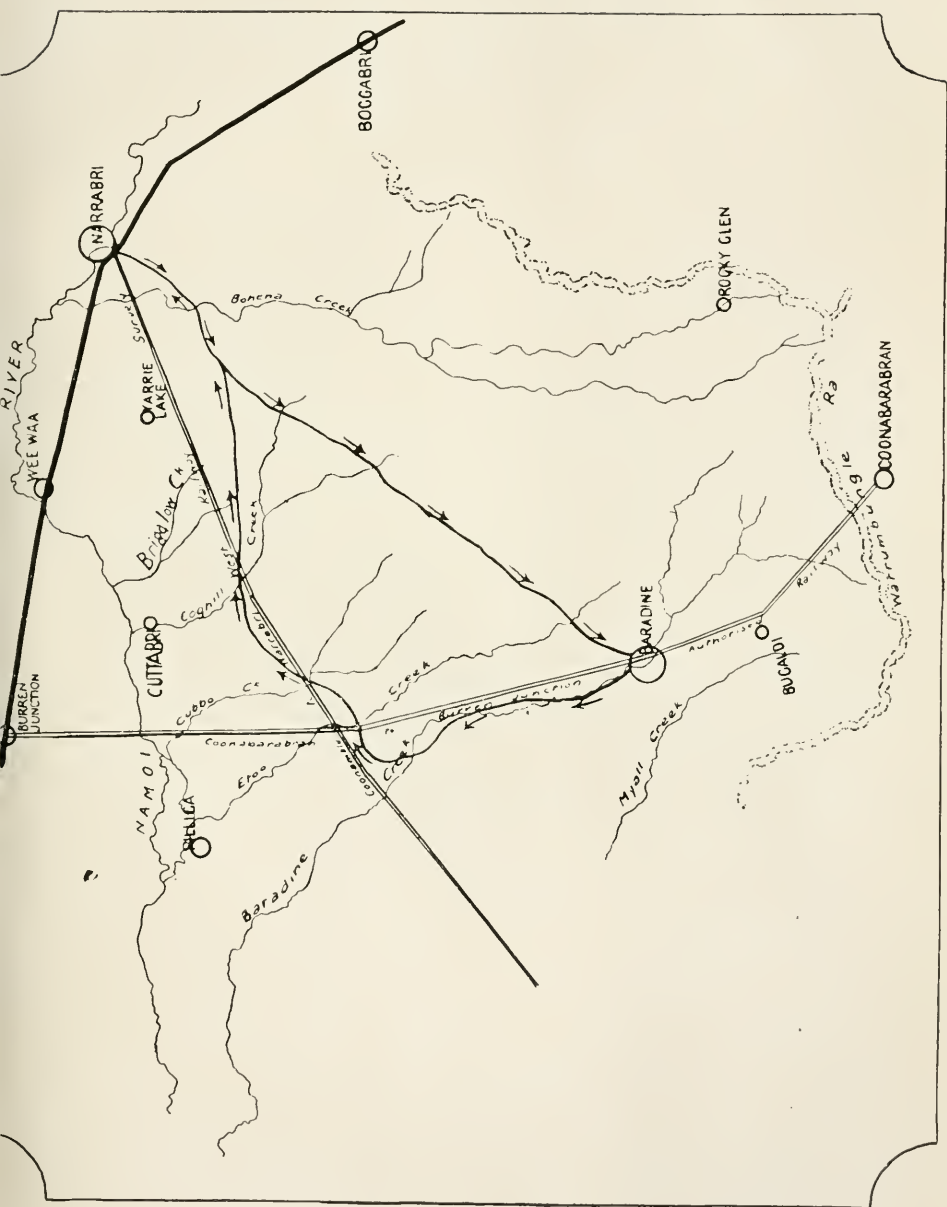
mentioned, but to complete the record we add a list of those omitted from the narrative. They are:—Brush Bronzewing Pigeon, Peaceful Dove, Kestrel, Laughing Jackass, Welcome Swallow, Tree-Martin, Black-and-White Fantail, Black-faced Cuckoo-Shrike, Spotted Ground-Bird, Brown Tit, Blue Wren, Magpie-Lark, Harmonious Shrike-Thrush, White-backed Magpie, Butcher-Bird, Silver-eye, Spotted Pardalote, Pipit, Fire-tailed Finch, Pied Crow-Shrike, Yellow-rumped Tit, White-fronted Chat, Brown Flycatcher, Black Cockatoo, White-naped Honey-eater, Spinebill, Fan-tailed Cuckoo, Pelican, White-browed Scrub-Wren, Yellow Robin, Bell Miner, Rosella, Rufous Thickhead, White-throated Tree-creeper, Buff-rumped Tit, Leaden Flycatcher, White-throated Thickhead, Fairy Martin, King Parrot, White-shouldered Caterpillar-eater, and the introduced Sparrow, Starling, and Goldfinch. On the return journey a Crow was seen between Marlo and Orbost, and Gang-Gang Cockatoos from the railway at Nowa Nowa.

The Birds of the Pilliga Scrub, New South Wales.

BY J. BURTON CLELAND, M.D.

DR. H. I. Jensen once defined the Pilliga Scrub as comprising "an oval area situated between the Namoi and Castlereagh Rivers, or, to be more precise, between the towns of Pilliga, Narrabri West, and Coonabarabran. The town of Baradine is a few miles within the western limit of the Pilliga Scrub proper. The town of Boggabri is about 14 miles east of it. The area of the Pilliga Scrub proper is about 2,000,000 acres, and its most notable characteristic is that no large stations are found within its borders, whereas it is hemmed in on all sides by large stations and closely occupied country." He then proceeded to describe its nature as follows:—"The Pilliga Scrub consists of many kinds of country, none of which constitute 'scrub' in the sense in which the term is used in the eastern portions of the State. Part is dense brigalow and belah forest; part is open ironbark, gum, and stringybark forest; part, again, is dense pine forest; and other parts consist of dense bushy undergrowth. Some parts are badly overgrown with prickly pear, which is spreading rapidly in all directions. Animal, insect, and bird life is very scarce; only two kangaroos were seen on the traverse, and not a solitary Emu. Dingoes are, however, fairly abundant, as are also foxes. Rabbits are very scarce, except in settled portions on the fringe of the scrub, whence they are able to make daily raids on cultivation paddocks or on the sweet grasses of the plains."

Through the kindness of Mr. Gordon Burrow, district forester, Narrabri, I recently had the opportunity of traversing this interesting country in his company. Our route lay diagonally across the area, from Narrabri to Baradine. We then proceeded north some 20 miles to Wangan, and then across the area again,



Route taken by Dr. Cleland through the Pilliga Scrub.

by a slightly more northern route, striking our outward track about 25 miles from its starting-point. Total, 189 miles. Our journey, which was made in a buggy, was divided into fifteen stages, which were made use of later in compiling the bird survey.

The nature of the country, as summarized by Dr. Jensen, may be detailed more fully as met with by us. The outskirts—Baradine to Wangan and the neighbourhood of Narrabri—are more or less cleared for pasture and occasional crops. The intervening country between Narrabri and Baradine, about 60 miles as the Crow flies, and necessarily longer by our route, possesses little permanent water, though traversed at intervals of miles by several water-courses running from the Warrumbungle Mountains towards the Namoi. In the beds of these occur some relatively permanent water-holes, which still for a while yield a supply of water by digging after the surface has evaporated. Occasional wells have been sunk, and in the northern part of our journey, near Old Cubbo Station, we came upon a sub-artesian bore. This scarcity of sheets of water led necessarily to very few water or marsh birds being seen. Along the beds of the water-courses large trees (*Eucalyptus tereticornis*, and sometimes *Eucalyptus rostrata*) and shrubs such as *Leptospermum* and *Acacia* occur. In the country between the creeks considerable diversity is met with in the flora. Thus, in parts are dense forests of white cypress pine (*Callitris robusta* [glauca]), sometimes alone, sometimes with ironbarks (*Eucalyptus crebra*, and near Baradine *Eucalyptus melanophloia*). Then there are areas of more open forests with ironbarks (*Eucalyptus crebra*, *E. sideroxylon*, *E. siderophloia*), *E. dealbata*, bull-oaks (*Casuarina luehmanni*), some white pines, and under-shrubs. The better class of country, met with more on the outskirts, grows forest trees and budda (*Eremophila mitchelli*). The gilgai country, with its irregular ruts and hollows, is covered with brigalow (*Acacia harpophylla*), or with belah (*Casuarina lepidophloia*). What are known as "broom-flats" have an abundant broom-like growth of *Melaleuca uncinata*, often intermixed with other under-shrubs, of which *Calythrix tetragona* may be by far the most abundant, or may replace the *Melaleuca* entirely. These belts, often only a few hundred yards across, form open country compared with the obstructed view in the forests. The blood-wood rises are barren areas only slightly raised, with groups of *Eucalyptus trachyphloia* and under-shrubs.

Naturally, the birds were met with in most numbers near water. Very few were seen in the broom flats or the forest when not near water.

There seems little doubt that the scarcity of animal life mentioned by Dr. Jensen exists. No snakes were seen, and Mr. Burrow tells me the only one of these reptiles he has seen in his frequent journeys through the Pilliga Forest was a carpet snake. Monitors (*Varanus*, sp.) were met with, and an occasional small skink. One fox was seen (near Baradine, on the outskirts of the

town). Dingoes were not heard by us, but others speak of their howlings. One kangaroo and no wallabies were noticed. Even rabbits were few, except in occasional favoured spots; thus, over one stage of about 14 miles only two were counted, over another of 24 miles 12, and over one of 12 miles 23. Even human beings were few, and none was seen between 15 miles from Narrabri and the same distance from Baradine. In the centre of the area a few March-flies (*Tabanidæ*) were seen, and occasional mosquitos were caught. Later in the year the latter seem to be numerous. Even ants were not very abundant, though, of course, present.

In spite of this relative absence of animal life, about 83 species of birds were recognized during the journey of ten days over the 189 miles of country, and approximately 1,604 individuals of these species. The assessment of the latter may be more fully explained. For over eighteen months previously I had made it a practice, when making a through journey by foot, driving, or by motor-car, to note on a slip of paper the species of birds seen and the numbers of each species met with. To those acquainted with the flight, the shapes, and colouring of Australian birds, together with their habits and notes, it is not difficult to recognize with reasonable certainty many or most of the species disturbed by one's progress along a road or on a track, provided a fair view is obtained. In some cases doubt will exist as to whether the bird is one or the other of two related species. In other cases only a glimpse is obtained, or the bird may be at some distance, and so a guess can alone be made. On the whole, however, my experience, over many different types of country from Broken Hill to the North Coast of New South Wales, has been that relatively reliable results are obtained as regards most of the species met with, and it seems reasonable to assume that the numbers seen represent at least a *minimum* for the bird population in the area over which observation has been made. By a "minimum bird population" I mean that at least the number of individuals recorded as seen exist in the area. This, of course, is not to be taken as meaning that, in the type of country concerned, the minimal numbers of individuals of each species, actually present in any particular belt at one time, are only those thus recorded. The actual numbers of birds present in the observed area may be really much larger, and is probably nearly always considerably larger, than the numbers actually seen, as many must have escaped observation. As regards some species (e.g., *Grallina* and *Gymnorhina*), the numbers seen probably approximate closely to the numbers present. In other cases, as amongst the *Acanthizæ*, the numbers are probably far greater. On the whole, however, it may be said that the observed numbers do give us some indication of the density of bird-life, and are certainly a very conservative under-estimate of the true population. What, of course, they more clearly indicate is the number of birds of each species one may expect to see over a journey of such a distance by such and such a means of progression. That

this expectation is one likely to be realized within limits is seen by figures representing outward and inward journeys over the same or similar country. In several cases, as regards various species, I have found the numbers on the two journeys to approximate very closely. In the present instance rather striking parallelisms resulted when the figures for the outward and return journeys were compared. Thus, 193 *Myzanthæ* were counted going to Baradine and 187 on the return journey by a slightly longer route; the figures for *Struthidea cinerea* were respectively 111 and 83, and for *Corcorax melanorhamphus* 32 and 30; whilst for *Rhipidura motacilloides* they were 25 each way. The two journeys make a check on each other, and if the numbers recorded err gravely in showing the true bird population, much more discordant results than these should have been obtained when considering birds more or less universally distributed throughout the area traversed (as shown by their being recorded in so many stages of the journey). Birds, of course, only met with in limited areas, and then perhaps in numbers (in this case, for example, Fairy Martins and *Arlamus superciliosus* and *A. personatus*), cannot be taken as checks for this purpose.

The area of observation is a difficult matter to decide, and varies with the means of progression, the kind of country, and the species of bird. It is the distance travelled multiplied by the distance the view extends on each side of the track. In open country this latter may be extensive for large birds such as Hawks—perhaps a quarter or even half a mile on each side—whilst for small birds in cover it may be a chain or less. One may perhaps make a general conservative estimate of 10 chains to include mixed types of country where forest is offset by more open plains. This would give the lateral range of vision as a quarter of a mile, so that the distance travelled divided by 4 will give the area over which observation has been made. On this basis, the number of individual birds of each species per acre or per square mile may be considered fairly exact for the larger and medium-sized birds, but a great under-estimation for small birds or birds keeping hard to cover. Taking the above estimate as a standard, however, each species can be dealt with on its merits, according to its habits, the nature of the country, &c. The numbers of birds seen may, for convenience, be estimated per square mile on the above basis, and then individual species may have, if necessary, a multiplying factor added to show roughly the modification necessary in each case. For instance, if the distance the birds can be seen on *each* side of the track be estimated at only half of the above 10 chains, this factor will be 2.

In the tables I kept* I have recorded the species of birds seen whilst travelling, the numbers met with on each stage of the journey (indicating general or local distribution of a species), the totals for the outward and return journeys (which show the reliability of the method), the grand totals, and the estimated

* Pressure on space has prevented their inclusion.

minimal numbers of individuals, of those species to which this method of computation reasonably applies, present in the two million acres of the Pilliga Scrub (it being assumed that on the whole the rest of the area is not dissimilar to any extent from that traversed).

If we thus can estimate roughly the numbers of birds of each species in this area, and had reliable data as to their daily minimal rations, as exemplified by the examination of the stomach contents of individuals, we could make out a crude estimate, by multiplying by 365, of the amount of food consumed by the individuals of each species in a year. If noxious insects were included in the diet, we could say roughly that the birds concerned had destroyed in this area in a year so many of these. I am not, of course, in a position to obtain all the requisite data, but I mention these interesting deductions as showing what possibilities exist for applying the method of bird assessment here presented to practical purposes. Various members of the R.A.O.U. may have opportunities of elaborating it more fully as regards certain areas. Its employment, from the point of view of teaching the public the value of birds, is obvious.

I propose later to publish in full my other data. Meanwhile, the Pilliga Scrub ones are presented as being germane to this contribution.

In the following enumeration the name adopted in the R.A.O.U. "Check-list" is followed by that given by Mathews in "A List of the Birds of Australia."

1. *Dromaius novæ-hollandiæ* (*Dromiceius novæhollandiæ*). Emu.—A flock of seven Emus was seen in the middle of dense scrub on the outward journey, and one bird on the return route. Dr. Jensen saw none.

6. *Leipoa ocellata* (*L. o. rosinae*). Mallee-Fowl.—We saw neither the birds nor their mounds, but I was informed that they are occasionally seen.

10. *Excalfactoria australis* (*E. chinensis australis*). Chestnut-bellied (King) Quail.—I did not see this bird, but one of my companions, Mr. Taylor, flushed a "King Quail" at Old Cubbo Station.

26. *Geopelia humeralis* (*Chrysauchæna h. humeralis*). Barred-shouldered Dove.—Several "Squatter Pigeons" were seen near Wangan, specimens being obtained. Mr. Burrow saw elsewhere an occasional bird also. Iris, old straw-yellow; bill bluey-grey; pharynx greyish-flesh; legs crimson lake. No entozoa.

27. *Geopelia tranquilla* (*G. placida tranquilla*). Ground-Dove.—Met with nearly throughout the journey, being flushed from the track as we drove along. Thirty-five were counted over the 189 miles. If these birds could be seen and disturbed for a distance of 10 chains on each side of the track, this would mean that 35 birds were met with over an area of about 47 square miles, which is about 1/66th of the area of the Pilliga Scrub. If uniformly distributed throughout the scrub, and if the above number represents a fair average, then the minimum number inhabiting the whole area would be $35 \times 66 = 2,310$. If the distance they could be disturbed from

and seen was less than 10 chains, the number would be greater. As these birds show such a marked predilection for feeding along roads and tracks (it would be interesting to know why), the above assumption that they are uniformly distributed over the area may be an error.

30. **Phaps chalcoptera** (*P. c. chalcoptera*). Bronze-winged Pigeon.—These birds were flushed from the track nearly throughout the journey, but especially between Wangan and Old Cubbo Station. Thirty-three were counted in all, which, on the above calculation, would give 2,178 for the whole area of the Pilliga Scrub. These birds also specially favour the roadsides. Iris very dark brown; bill black; legs crimson lake. No entozoa.

39. **Ocyphaps lophotes** (*O. l. lophotes*). Crested-Pigeon.—One bird was recognized near Wangan, and probably a few more were flushed during the journey.

130. **Zonifer pectoralis** (*Z. t. tricolor*). Black-breasted Plover.—One bird seen in a paddock at Old Cubbo Station.

139. **Ægialitis nigrifrons** (*Elseya m. melanops*). Black-fronted Dottrel.—A pair seen on Baradine Creek, near Wangan. Running over the sand, the white under surface catches and reflects the light from the side.

171. **Ædicnemus grallarius** (*Burhinus m. magnirostris*). Southern Stone-Curlew.—One bird seen and several heard during the trip.

176. **Carpibis spinicollis** (*C. spinicollis*). Straw-necked Ibis.—One seen near Narrabri.

191. **Nycticorax caledonicus** (*N. c. australasiæ*). Nankeen Night-Heron.—One seen on Bohena Creek.

221. **Phalacrocorax gouldi** (*Hypoleucis fuscescens*). White-breasted Cormorant (probably).—One flushed from Baradine Creek, near Wangan.

243. **Uroaëtus audax** (*U. a. audax*). Wedge-tailed Eagle.—Only three were seen.

248. **Haliastur spheonurus** (*H. spheonurus*). Whistling-Eagle.—One was seen near Wangan.

In addition to the above four birds of prey, three large Hawks and two smaller ones were seen, giving nine in all. This is a remarkably small number for such a long distance travelled, and bears out Dr. Jensen's remark on the scarcity of animal life and our own observations on the fewness of lizards. One of the small Hawks may have been *Falco lunulatus*.

280. **Glossopsitta pusilla** (*G. pusilla*). Little Lorikeet.—A pair was recognized at Lane's mill, on Coghill Creek. Occasional flocks of Lorikeets were seen passing overhead, perhaps this species also.

291. **Cacatua galerita** (*Cacatoes g. galerita*). White Cockatoo.—Two birds seen—one near Baradine, one at Old Cubbo Station.

295. **Cacatua roseicapilla** (*Eolophus r. roseicapillus*). Galah.—Thirty-four seen, one flock containing 10.

298. **Calopsitta novæ-hollandiæ** (*Leptolophus a. auricomis*). Cockatoo Parrot.—Three seen near Baradine.

302. **Ptilistes erythropterus** (*Aprosnectus e. erythropterus*). Red-winged Parrot.—Ten or more of these interesting Parrots frequented

the deserted homestead at Cubbo Station, in the centre of the Pilliga Scrub. They settled on small planted trees round the water-trough. Specimens shot had the crop full of manna scale (identified by Mr. W. W. Froggatt as the manna lerp, *Spondyliaspis eucalypti*). The note uttered by these Parrots is remarkable, resembling the tinkling of dolls' bells. Iris orange; bill reddish-orange, yellower near tip; legs dark greyish-black. No entozoa.

311. **Platycereus eximius** (*P. e. eximius*). Rosella.—Thirteen birds seen on the journey, scattered mostly throughout. On the basis of enumeration suggested under *Geopelia tranquilla*, the minimum population for the Pilliga Scrub would be about 858.

315. **Barnardius barnardi** (*B. b. barnardi*). Ring-necked Parrot.—“Bullen-bullens” were met with almost throughout the journey, 38 being counted, giving a population of 2,508. Iris dark brown; bill pale horn; legs dark grey. No entozoa.

324. **Psephotus hæmatonotus** (*P. hæmatonotus*). Red-backed Parrot.—Eighteen birds were seen, mostly near Narrabri or Merebene—i.e., near cleared or cultivated or open country.

333. **Melopsittacus undulatus** (*M. u. undulatus*). Warbling Grass-Parrot.—A flock of eight seen at Old Cubbo Station.

341. **Eurystomus pacificus** (*E. orientalis pacificus*). Australian Roller.—Mr. Taylor informed me he had seen a Dollar-Bird near Wangan, but it was too much hidden for me to diagnose it.

345. **Dacelo gigas** (*D. g. gigas*). Laughing Jackass.—Occasional birds (seven in all) seen throughout the journey, giving an estimated minimum population of 462 for the Scrub. One, in very poor condition, was found drowned in a deep soak at Cumbil, on Etoo Creek; it had a large nematode like an *Ascaris* in the intestine. Iris greyish.

349. **Halcyon sanetus** (*Sauropatis s. sancta*). Sacred Kingfisher.—One noticed near Baradine.

352. **Merops ornatus** (*Cosmærops o. ornatus*). Australian Bee-eater.—A few birds, 12 in all, were seen throughout the area traversed. Estimated minimum population, 792.

Chalcococcyx, sp.—A Bronze-Cuckoo was heard at Merebene.

372. **Scythrops novæ-hollandiæ** (*S. n. novæhollandiæ*). Channelbill.—The weird notes of these birds were heard at Top Well, on Coghill Creek, and at Old Cubbo Station, in the early morning. On the return journey, near Goona Creek, one flew across our track and uttered its peculiar note after being chased.

384. **Hirundo neoxena** (*H. n. neoxena*). Welcome Swallow.—A few were seen at Narrabri, Baradine, and Merebene, near towns or homesteads. They were not noticed in the scrub itself, where human habitations are almost non-existent.

385. **Cheramœca leucosternum** (*C. l. stonei*). White-backed Swallow.—A pair of these birds was seen on the sandy banks of Baradine Creek, near Wangan.

386. **Petrochelidon nigricans** (*Hylochelidon nigricans caleyi*). Tree-Martin.—It is hard to distinguish these birds from the Fairy Martins on the wing. Amongst the numbers included under the latter, probably some Tree-Martins are included.

387. *Petrochelidon ariel* (*Lagenoplastes a. ariel*). Fairy Martin.—Like the Welcome Swallow, Fairy Martins were only seen near human habitations. Their nests were numerous on the walls of houses at Narrabri and Baradine. Their numbers in these localities may be gathered from 79 being counted whilst driving into Narrabri straight to the hotel.

388. *Microeca fascians* (*M. f. fascians*). Australian Brown Flycatcher.—Odd birds were seen almost throughout the trip, but only 16 altogether.

392. *Petroica leggia* (*P. multicolor coccinea*). Scarlet-breasted Robin.—Five birds were seen, though perhaps some of the four undiagnosed female Robins were this species.

394. *Petroica goodenovii* (*Whiteornis goodenovii quoyi*). Red-capped Robin.—Seven birds were recognized, mostly near Narrabri. Perhaps some of the above four females were this species.

397. *Melanodryas bicolor* (*M. c. cucullata*). Hooded Robin.—One bird seen on Bohena Creek. Iris, bill, and legs black; pharynx flesh. No entozoa.

400. *Smicornis brevirostris* (*S. b. brevirostris*). Short-billed Tree-Tit.—Numerous throughout the journey, though, owing to their small size, and the fact that they are not easily disturbed, only 15 were counted. Iris white, with a tinge of yellow; bill light brown; pharynx flesh-coloured; legs light brown, but darker than bill. No entozoa.

418. *Eopsaltria australis* (?) (*E. a. australis*?). Yellow-breasted Shrike-Robin.—A single Yellow Robin, presumably this species, was seen in the Merebene district.

430. *Pachycephala rufiventris* (*Lewinornis r. rufiventris*). Rufous-breasted Whistler.—These birds were heard much more often than seen throughout the journey. Though only 11 were enumerated, giving an estimated minimum population of 726, the actual numbers along the route were considerably greater. Two female birds secured had bills and legs greyish-black; pharynx greyish-flesh; irides reddish-brown. One had cestodes in the intestine, the other none.

436. *Rhipidura albiscapa* (*R. flabellifera alisteri*). White-shafted Fantail.—Only two were seen—one 15 miles from Baradine and one near Narrabri.

442. *Rhipidura motacilloides* (*Leucocirca t. tricolor*). Black-and-White Fantail.—Met with almost throughout the journey, 50 being seen altogether, giving an estimated minimum population for the scrub of 3,300. It is interesting that the same numbers were seen on the outward and inward journeys, suggesting that this method of enumeration is fairly accurate.

443. *Seisura inquieta* (*S. i. inquieta*). Restless Flycatcher.—Only four birds were seen.

457. *Graucalus melanops* (*Coracina novæhollandiæ melanops*). Black-faced Cuckoo-Shrike.—Two seen near Narrabri.

459. *Graucalus mentalis* (*Coracina r. robusta*). Little Cuckoo-Shrike.—Two birds seen on the trip were thought to be this species; another *Graucalus* was not specifically allocated.

462. *Campephaga humeralis* (*Lalage t. tricolor*). White-shouldered Caterpillar-eater.—Only three birds seen on the trip.

478. *Pomatorhinus temporalis* (*Pomatostomus temporalis trivirgatus*). Australian Babbler.—Uniformly distributed throughout the journey. 97 being counted, giving an estimated minimum population of 6,422. The numbers seen in "families" were as follows:—Nine on one occasion, 8 on one, 7 on two, 6 on one, 5 on four, 4 on three, 3 on six, 2 on three, and 1 on four occasions.

479. *Pomatorhinus superciliosus* (*Morganornis superciliosa gilgandra*), White-eyebrowed Babbler.—A few birds seen near Baradine and Narrabri. Bill and legs blackish; pharynx greyish; iris dark brown.

484. *Cinclorhamphus cruralis* (*C. c. cruralis*). Brown Song-Lark.—One was seen in a field round Old Cubbo Station, in the heart of the Pilliga Scrub.

485. *Cinclorhamphus rufescens* (*Ptenædus mathewsi vigorsii*). Rufous Song-Lark.—This species was first met with just after leaving Top Well, on Coghill Creek. A bird was flushed in lightly timbered country and flew into a small bush. After hopping about in this it was secured. Another bird was met with near the edge of a field at Old Cubbo Station. It also was hopping about in bushes, and then flew on to a post. No note was uttered in either case. These habits were unlike those of *C. cruralis*, and the type of country frequented by the two birds was not the kind one would expect to find *Cinclorhamphus* in. At the time I did not recognize the species, and it was only on my return that I referred them to *C. rufescens*, and this identification was confirmed for me by Mr. Basset Hull. The two birds varied a good deal in size. Bird 1.—Iris dark brown; bill light brown, paler below; pharynx greyish-black; legs flesh-brown. Bird 2.—Iris light clay-brown; bill brown, paler below; pharynx smoky brown; legs light brown. No entozoa in either.

501. *Chthonicola sagittata* (*C. s. sagittata*). Speckled Warbler.—A pair seen near Narrabri.

503. *Acanthiza nana* (*A. n. nana*). Little Tit-Warbler.—These birds were found in the fields near Baradine, flying about the white cypress pines. Bill, pharynx, and legs blackish; iris whitish. No entozoa detected in the one bird obtained.

507. *Acanthiza reguloides* (*Geobasileus v. reguloides*?). Buff-tailed Tit-Warbler.—A few birds—13 in all counted, but there were evidently considerably more—were seen in the more open forest country during the trip. Bill, pharynx, and legs black; iris whitish, with a pale yellow tint. No entozoa detected in the one bird shot.

516A. *Acanthiza albiventris* (*A. pusilla albiventris*). White-vented Tit-Warbler.—Several of these birds were seen moving about quickly amongst low bushes at Top Well, on Coghill Creek, and Cumbil, on Etoo Creek. One was secured. Bill, pharynx, and legs black; iris reddish-brown. No entozoa.

The reddish-brown-eyed *Acanthizas* seem to form a natural group separated from those with whitish irides, such as *A. chrysorrhoa*, *A. reguloides*, and *A. uropygialis*.

Half a dozen further birds of this genus were seen, but not close enough to allow of identification.

530. *Malurus cyaneus* (*M. cyaneus cyanochlamys*?). Blue Wren-Warbler.—Only one seen, on Baradine Creek.

560. *Artamus superciliosus* (*Campbellornis s. superciliosus*). White-browed Wood-Swallow.—A few birds of this species and of the following were seen throughout the journey at odd places, but in the neighbourhood of Merebene and Wangan they were found in large numbers, resting in white cypress pines (*Callitris robusta*), eucalypts, and dead ring-barked trees on the edges of cleared land. Early one morning, every half-hour or so, they rose in a cloud into the air, probably 200 or more being seen at one time. The cloud of birds gradually circled higher and higher, making a great noise, and separating as they rose. Finally they made their descent and returned to the trees. The two species were intermixed, though probably *A. personatus* predominated. Noticing that the birds were congregating on the upper branches of some of the white cypress pines, I approached close to them, and was surprised and interested to notice that they were apparently feeding on something, and were not assembling together prior to further migration. Looking carefully on the trees where they had been feeding, a few scale insects at once arrested attention, and seemed a reasonable explanation for the attraction of the birds. However, shortly afterwards one of my companions, Mr. Taylor, called my attention to glistening points, on the fine branchlets of some of these pines, that caught and reflected the morning light. It was, he said, a honey secretion that appeared when "the sap began to move"—*i.e.*, about the time of flowering. When the small twigs of such a tree were handled, the hands became very sticky, whilst the branchlets and leaves, when sucked, gave a sweet taste. A small bunch, taken to Sydney, was still quite sticky on arrival, and was handed over to Mr. H. G. Smith, of the Technological Museum, who was able to ascertain that the exudation, which was not associated with any insect parasite, was a true sugar. This phenomenon has apparently not been recorded previously. After having this interesting feature pointed out to me, I returned to my Wood-Swallows, and, by watching them, satisfied myself that they were indeed feeding on this secretion. I then recalled that, whilst skinning a Wood-Swallow on the previous evening, I had found the crown of the head sticky, as if from honey. One of each species shot was, it may be added, rolling in fat. It would be of interest to know whether the migration of these Wood-Swallows is in search, in part, of pines bearing this secretion, and whether annually they repair to particular areas for it. Iris very dark brown; bill black at the tip, base bluey-grey; pharynx blackish; legs black, with a whitish bloom. No entozoa.

561. *Artamus personatus* (*Campbellornis personatus munna*). Masked Wood-Swallow.—This was met with in company with the preceding, and predominating, perhaps greatly, in numbers. Over 218 birds of the two species were counted whilst travelling, thus avoiding counting the same birds again. Probably many more were actually seen altogether. Iris very dark brown; bill black at the tip, base bluey-grey, inside of bill black; pharynx flesh-coloured; legs greyish-black, with white bloom. No entozoa.

564. *Artamus sordidus* (*Pseudartamus cyanopterus*). Wood-Swallow.—Nineteen birds were counted, distributed throughout the journey, giving a minimum population for the Pilliga Scrub of 1,254. The difference between the migratory congregational habits of the two former species and the endemic distribution and more isolated habits of *A. sordidus* support their generic separation by Mathews.

566. *Colluricincla harmonica* (*C. h. harmonica*). Grey Shrike-Thrush.—Sixteen birds counted, uniformly distributed throughout the journey. Estimated minimum population, 1,056.

575. *Grallina picata* (*G. cyanoleuca*). Magpie-Lark.—Thirty-eight birds counted, for the most part distributed over the route traversed. Estimated minimum population, 2,508.

576. *Struthidea cinerea* (*S. cinerea*). Grey Jumper.—These "lousy birds," as they are popularly called, from the presence of *Mallophaga*, were amongst the most numerous and universally distributed of the species met with. Companies were often seen in the heart of the scrub, apparently often not near water. Altogether, 194 were counted, which, on the previous estimation, gives a minimum population for the scrub of 12,804. From my notes I find that the numbers of birds found together in "families" during the trip were as follows:—14 on one occasion, 9 on three occasions, 8 on three, 7 on three, 6 on five, 5 on five, 4 on five, 3 on five, 2 on six, and 1 on six occasions. Possibly in some instances, as when 14 were seen, two "families" may have been met with near each other, and probably in many cases not all of the members of the "family" were counted. It would be interesting to know the sex and age of the members of a "family" and also whether "families" ever amalgamate.

577. *Corcorax melanorhamphus* (*C. m. melanorhamphus*). White-winged Cough.—Of this species, also congregating in "families," 62 members were seen, distributed mostly in the centre of the Scrub. Estimated minimum population, 4,092. The numbers of birds seen in the various "families" were as follows:—Twelve on one occasion, 8 on one, 7 on two, 6 on one, 5 on one, 4 on two, 3 on one, 2 on two, and 1 on two occasions.

578. *Aphelocephala leucopsis* (*A. l. leucopsis*). Whiteface.—Four birds seen on the Baradine side.

592. *Climacteris scandens* (*Neochmia p. picumna*). Brown Tree-creeper.—Fourteen birds counted, uniformly distributed through the scrub. Minimal population, 924. Iris dark brown; bill and legs black; throat blackish. No entozoa.

Pardalotus, sp.—Several Pardalotes were seen but not identified, and a number of others were heard.

619. *Melithreptus brevirostris* (*M. a. atricapillus*). Brown-headed Honey-eater.—A party of 7 seen round a water-hole at Merebene. Iris dark brown; bare space below eye pale sage green above, pale blue below; bill black; throat orange; legs light brown; liver pale yellow. No entozoa.

661. *Ptilotis penicillata* (*Ptilotula p. penicillata*). White-plumed Honey-eater.—Forty-six birds counted on the trip, uniformly distributed throughout the journey, but especially found in tall eucalypts near water-courses. The estimated minimum population of 3,036 is probably considerably too low, as many birds were probably not observed in the leafy trees. A specimen shot had the bill black, the iris very dark brown, the pharynx and palate orange, and the legs greyish-brown. The liver was pale, as is so frequently the case in the Honey-eaters, being perhaps attributable to so much sugary food, though this particular species must feed chiefly on insects rather than nectar. No entozoa detected.

672. *Myzantha garrula* (*M. m. melanocephala*). Noisy Miner, and

674. *Myzantha flavigula* (*M. f. flavigula*). Yellow-throated Miner.

Miners were numerous throughout the whole trip, being often the only bird met with in the long dry stretches between creeks. Two hundred and eighty were counted, giving an estimated minimum population of 18,480. A reference to our recent work on "The Food of Australian Birds" (Dept. of Agric., N.S.W., Science Bulletin No. 15, p. 85) will show how varied is the insect food of these birds. Over 18,000 (and this is probably a very conservative estimate) of fairly capacious empty stomachs to be filled daily with insect food, obtained mostly from the timber-trees of the Pilliga Scrub, must mean much in protecting these from injurious insects. During the course of the year these stomachs have to be replenished over $6\frac{1}{2}$ million times, allowing for their being filled only once a day! Unfortunately, beyond counting the Miners as they were seen, a careful scrutiny of them was not made at the time to see if they were all *M. flavigula* or whether both species were present.

679. *Acanthogenys rufigularis* (*Acanthogenys r. rufogularis*). Spiny-cheeked Honey-eater.—Several birds were recognized at Merebene, and at Old Cubbo Station in the few trees planted round the well.

680. *Entomyza cyanotis* (*Entomyza c. cyanotis*). Blue-faced Honey-eater.—Several birds came to drink when we poured water from the well into the trough at Lucky Flat, and a few others were diagnosed, but it is probable that many more escaped recognition.

684. *Tropidorhynchus corniculatus* (*T. c. corniculatus*). Leather-head.—Twenty-eight were counted, mostly distributed throughout the journey. The estimated population (1,848) is probably much too low, as it is certain that a number more of these birds were seen, but not close enough for identification.

687. *Anthus australis* (*A. a. australis*). Australian Pipit.—Seven were counted, all between Baradine and Merebene, where the country was cleared and grassy.

692. *Stagonopleura guttata* (*S. g. guttata*). Spotted-sided Finch.—A flock of 5 were in the fields round Old Cubbo Station—a little oasis in the midst of the scrub.

732. *Corvus coronoides* (*C. c. coronoides*). Crow.—We thus designate all the Crows seen, 33 in number, met with mostly throughout the journey. Estimated minimum population, 2,178.

741. *Cracticus nigrogularis* (*C. n. nigrogularis*). Black-throated Butcher-Bird.—Three birds were recognized.

745. *Cracticus destructor* (*Bulestes t. torquatus*). Collared Butcher-Bird.—Two of these were seen. In addition, three individuals were heard, but not seen, and the species to which they belong was not determined. A few others were also heard, but a note not made of them.

747. *Gymnorhina tibicen* (*G. t. tibicen*). Black-backed Magpie.—Twenty-two individuals seen on the trip, distributed over the area. Estimated minimum population, 1,452.

750. *Gymnorhina leuconota* (*G. hypoleuca intermedia*). White-backed Magpie.—Two birds seen in the middle of the Scrub seemed to have white backs. The view of them was not very distinct, and I may have been mistaken.

Passer domesticus. Common Sparrow.—These, 38 in number, were only seen near Narrabri and Baradine (27 miles from Coonabarabran railway station). Considerable interest has recently been aroused in connection with the spread of these birds in Australia. So far they have not reached Western Australia from the eastern States, and Captain S. A. White has been deputed to watch the Transcontinental line to ascertain the extent of spread in this direction. At Kendall, on the North Coast line of New South Wales, a couple of years ago, I was informed by a local resident that they had not appeared in this town until the new railway reached there. Then they first made their appearance, presumably following the construction camps along the route from Taree. However, they are abundant in the fields of the Macleay district further on, though the railway has only recently reached Kempsey. They must, therefore, have reached the Macleay by some other means than following railway camps by short stages. They may, of course, extend over far areas when farms and clearings adjoin each other, but as far as I can see they do not pass a barrier of forest, scrub, or uncultivated spaces of sufficient extent. Moreover, I do not think it likely that they are ever transported in railway trucks or as stowaways on ships, except on such rare occasions as to prevent a single bird from propagating its kind at its destination. Where the birds have appeared along the Transcontinental line I presume this has been by their following the slowly-progressing camps from Port Augusta. As this railway was constructed from both ends, meeting in the centre, it seems to me there is little likelihood of the Sparrows reaching Western Australia by this means, as the railway camps did not form a direct moving bridge from Port Augusta to Kalgoorlie. In this connection, as showing another possible means of dispersion, I have an interesting note made on 8th November, 1905, when approaching the coast of Victoria from the south on a voyage from Cape Town. About mid-day, whilst a strong N.E. wind was blowing, several Sparrows came on board. As we were not off Cape Otway till daybreak next morning, these birds must have been blown to sea a distance of about 200 miles! Presumably a strong northerly wind had been blowing for several days, and the Sparrows, once caught in it, could make no headway against it. Having nowhere to alight, they had to fly on till at last the ship was sighted. Of course, had they been blown over land instead of sea, they would have found a resting-place quite soon. Wind-blown distribution, therefore, is a more practical means for the populating of islands than for distant dispersal by land.

Sturnus vulgaris. English Starling.—These, 27 in number, were only seen near Narrabri. Their powerful flight means that they are readily dispersed through suitable country.

Unidentified Small Birds.—Though only five are noted as being seen, the number of unrecognized small birds (probably all of species already detailed above) was considerably more, but only passing glimpses of them were obtained.

Stomach and Crop Contents.—The stomachs or crops of the various birds obtained were saved. Those containing insect remains were forwarded to the South Australian Museum to be examined by Mr. A. M. Lea, and to form part of the extensive series of birds' stomachs now being investigated by him. The

seeds obtained from other crops were submitted to Mr. J. H. Maiden, F.R.S., who has kindly supplied the following results of Mr. Breakwell's examination:—

26. *Geopelia humeralis*.—(1) *Argemone mexicana*, Mexican poppy, very plentiful—99 per cent.
A few seeds of *Urtica urens*.
(2) *Urtica urens* most plentiful—99 per cent. of contents.
Quartz particles fairly abundant.
Mexican poppy completely absent.
30. *Phaps chalcoptera*.—(1) *Urtica urens* (stinging nettle), very plentiful—95 per cent. of contents.
Argemone mexicana (Mexican poppy)—about 5 per cent. of contents.
Passiflora, sp., probably *P. hiberniana*—two seeds.
(2) Most of the contents quartz and stone; a fair quantity of *Urtica urens* and two seeds of *Chenopodium album*.

Mr. Maiden adds that it is interesting to note that the seeds of two noxious weeds are eaten in abundance by these two birds.

The accompanying map of the route traversed has been kindly prepared by Mr. C. J. Trist, of the Forestry Office, Narrabri, at Mr. Gordon Burrow's request.

Six Months' Record of a Pair of Mallee-Fowls.

COMMUNICATED BY J. A. ROSS, R.A.O.U., MALVERN (VIC.)

DURING the year 1916, and for a considerable part of the following year, Mr. J. J. Scarce, who was engaged in boring for water, was camped in the eastern angle of allotment 9 in the parish of Mamengorooock, in Victoria. This point is about 3 miles south of the most southerly part of the Pink Lakes, and about 6 miles N.N.E. from the Linga railway station, on the line which branches from the Mildura line at Ouyen to connect with the South Australian railway system at Pinnaroo. Mr. Scarce had always taken an interest in the birds of whatever locality he happened to be in, and for several years had generously allowed Mr. F. E. Howe and myself, and other members of the R.A.O.U. who from time to time accompanied us, to stay at his camps in various parts of the mallee country. In September, 1916, Messrs. F. E. Howe, T. H. Tregellas, R. H. Archer, and myself had an enjoyable fortnight in Mr. Scarce's camp, and such visits, occurring from year to year, stimulated his interest in the rare forms of bird-life in the country referred to.

For a long time he had given close attention to the Mallee-Fowl

(*Leipoa ocellata*), and on our visit in 1916 he showed us a nesting-mound at which a pair of birds had been working, and which he intended to watch closely for several months. It was within a few minutes' walk of the camp, and quite close to the road from Linga, along which all stores and materials for the boring party and the boring operations had to be carted, but, of course, could not be seen from the road.

Stretching over a period of six months, commencing on 1st October, 1916, and ending on 31st March, 1917, he visited the mound 66 times, and the notes taken were as follows:—

Date.	Temperature.		Condition of Mound.	Eggs.	Birds.
	Shade, camp.	Mound.			
	°F.	°F.			
Oct. 1	.. —	.. 84	Heaped up	.. —	One at mound.
" 3	.. 66	.. 84	Flat	.. —	Not seen.
" 5	.. 69	.. 84	Heaped up	.. —	Heard, not seen.
" 7	.. 75	.. 85	"	.. 1	Not seen.
" 11	.. 65	.. 86	"	.. 1	" "
" 13	.. 70	.. 86	Flat	.. —	" "
" 14	.. 63	.. 87	Heaped up	.. —	One at mound.
" 15	.. 55	.. 87	"	.. 1	" "
" 18	.. 69	.. 87	"	.. —	Not seen.
" 20	.. 74	.. 88	Flat	.. 1	" "
" 21	.. 62	.. 89	Heaped up	.. —	One at mound.
" 22	.. 65	.. 89	"	.. —	Not seen.
" 25	.. 60	.. 90	"	.. 1	One at mound.
" 27	.. 82	.. 90	Flat	.. —	Not seen.
" 28	.. 80	.. 91	Heaped up	.. —	" "
" 29	.. 59	.. 91	"	.. 1	Both at mound, love-making.
" 31	.. 62	.. 91	Flat	.. —	Not seen.
Nov. 2	.. 67	.. 91	"	.. —	" "
" 3	.. 69	.. 91	Heaped up	.. 1	" "
" 4	.. 66	.. 91	"	.. —	One at mound.
" 5	.. 60	.. 92	"	.. —	Not seen.
" 7	.. 75	.. 92	"	.. 1	" "
" 9	.. 78	.. 92	Flat	.. —	One at mound.
" 11	.. 74	.. 92	Heaped up	.. —	Not seen.
" 12	.. 55	.. 92	"	.. 1	One at mound.
" 14	.. 70	.. 92	"	.. —	" "
" 16	.. 71	.. 92	"	.. 1	One at mound, eating ants and seeds of turpentine bush.
" 17	.. 69	.. 92	Flat	.. —	Not seen.
" 18	.. 73	.. 93	Heaped up	.. —	" "
" 19	.. 60	.. 93	"	.. —	" "
" 21	.. 66	.. 92	"	.. 1	At wheat.
" 23	.. 69	.. 92	Flat	.. —	Not seen.
" 26	.. 56	.. 92	Heaped up	.. 1	One at mound, eating ants.
" 28	.. 72	.. 93	"	.. 1	One at mound, roosting in mallee.
" 30	.. 65	.. 92	"	.. —	One at mound.
Dec. 3	.. 54	.. 91	Open	.. 1	One working mound.
" 6	.. 71	.. 93	Heaped up	.. —	Not seen.
" 7	.. 75	.. 93	"	.. 1	" "
" 10	.. 56	.. 93	"	.. 1	" "
" 13	.. 73	.. 92	"	.. 1	" "

} Rain
for a
week.

Date.	Temperature.		Condition of Mound.	Eggs.	Birds.
	Shade, camp. °F.	Mound. °F.			
Dec. 17	.. 102	.. 93	Flat	.. —	At wheat.
„ 20	.. 99	.. 92	Heaped up	.. —	Not seen.
„ 22	.. 101	.. 94	„	.. 1	„
Jan. 9	.. 106	.. 96	„	.. 2	Both at wheat.
„ 14	.. 76	.. 96	Flat	.. —	Not seen.
„ 18	.. 84	.. 96	Heaped up	.. —	„
„ 21	.. 71	.. 96	„	.. —	„
„ 24	.. 69	.. 97	Flat	.. —	One at mound.
„ 28	.. 60	.. 97	Open	.. —	One working mound.
„ 31	.. 65	.. 97	Heaped up	.. —	Not seen.
Feb. 4	.. 61	.. 96	Fairly open	.. 1	Both filling in mound.
„ 7	.. 78	.. 97	Heaped up	.. —	Not seen.
„ 9	.. 70	.. 90	Opened right up	.. —	Not seen; raining.
„ 10	.. 71	.. 96	Flat	.. —	One at mound.
„ 11	.. 67	.. 95	Heaped up	.. —	Heard, not seen.
„ 14	.. 65	.. 94	„	.. —	One at wheat.
„ 18	.. 62	.. 95	Flat	.. —	Not seen.
Mar. 4	.. 79	.. 95	Heaped up	.. 1	„
„ 9	.. 52	.. 94	Flat	.. —	„
„ 11	.. 65	.. 92	Heaped up	.. —	Both at wheat.
„ 18	.. 61	.. 91	„	.. —	Not seen.
„ 23	.. 70	.. 89	„	.. —	„
„ 25	.. 65	.. 81	—	.. —	„
„ 28	.. 63	.. 75	—	.. —	„
„ 31	.. 69	.. 72	—	.. —	„

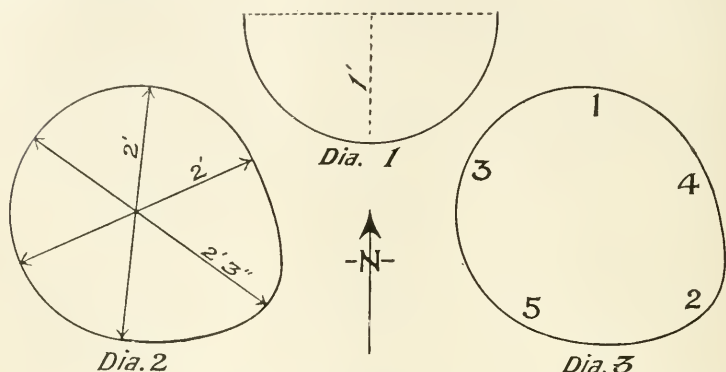
The date of one visit was not recorded, and no temperatures were taken. On this occasion heavy rain was falling; the mound was opened right out, and water was running into the egg-chamber. Where it is stated that the birds were "at wheat," they were seen at a farm a considerable distance from the mound.

The respective times when the readings of the thermometer were made at the camp and at the mound were all recorded, but to economize space I have not included these details. One visit at the mound was as early as 4.5 a.m., and another as late as 8.15 p.m.; but generally the inspections were much nearer mid-day. It is remarkable how even the temperature remained in the mound for long periods, although it varied so much at the camp.

The mound measured 64 feet in circumference (an unusually big specimen), was about 2 feet high when flattened out, and 3 feet 8 inches at the highest point when heaped up. The egg-chamber was scooped into the ground about 1 foot (diagram 1), and its circumference was inclined towards an oval with a diameter from 2 feet to 2 feet 3 inches (diagram 2).

The first five eggs were placed as indicated in diagram 3, and after the fifth egg had been deposited all subsequent eggs were placed in like rotation, so that at any time after the seventh egg had been taken Mr. Scarce knew in which part of the egg-chamber to look for the next egg. Add 5 or a multiple of 5 to any of the figures in diagram 3, and the egg bearing the resulting number

was found at the spot indicated by that figure. Thus, the 7th, 12th, 17th, and 22nd eggs were all placed where the second egg was taken from.



The birds did not work at the mound after 23rd March, although the marks of their feet showed that they had walked over it very frequently.

The placing of five eggs in a tier, as recorded above, is, as far as I can learn from the experience of others, and as far as my own experience goes, very unusual, but on 18th September, 1917, Mr. R. H. Archer, in company with Messrs. J. J. Scarce, F. E. Howe, H. A. Purnell, and myself, at a locality about 5 miles from the mound already described, found another which (according to my note book) "contained five eggs irregularly set in one tier."

Report on Investigations in Regard to the Spread of Prickly Pear by the Scrub-Turkey.

By G. B. BROOKES, INSTRUCTOR IN AGRICULTURE, ROCKHAMPTON.

THE Scrub-Turkey having been suspected by several observant settlers in pear-infested country of being the medium for carrying and distributing the seed of the prickly pear, Mr. G. B. Brookes, Agricultural Instructor for the Central District, was deputed by the Department of Agriculture to fully investigate the matter and report the results. Mr. Brookes has now furnished the following report on the subject:—

Although particulars have already been supplied covering a period dating from the inception of the inquiry, my remarks will, in this instance, embrace the whole of the work carried out.

The following are the principal points included in the scope of the inquiry:—

1. Are the Turkeys large consumers of pear fruit?
2. Are the seeds wholly digested by the birds?

3. What proportion of the seeds taken respectively from the crop, gizzard, and intestines, and those passed by the birds, germinate in comparison to those secured from the ripe pear fruit?

The findings arrived at are:—

I.—ARE THE TURKEYS LARGE CONSUMERS OF PEAR FRUIT?

The appearance of the birds received by the restaurants in town suggest that they feed largely on pear fruit, as evidenced by the purple stains on the head and feet. It may be of interest to mention that their method of securing the fruit is to fly over the plants, seizing the fruit in their claws while on the wing, then dropping it in a heap some yards distant. Quite a number of those collections were to be seen around scattered pear clumps.

To obtain definite proof that the Turkey consumed large quantities of pear fruit, six birds were shot in a pear-infested scrub lying between Stanwell and Westwood. Those birds were carefully opened, the quantity of seed secured from the respective birds being as follows:—

QUANTITY OF SEED SECURED FROM SIX TURKEYS.

Turkey No.	1.	2.	3.	4.	5.	6.	Totals.
Crop ...	147 ...	101 ...	315 ...	245 ...	0 ...	190 ...	998
Gizzard ...	180 ...	180 ...	170 ...	35 ...	160 ...	240 ...	965
Intestines	67 ...	0 ...	126 ...	0 ...	70 ...	0 ...	263
Totals ...	394 ...	281 ...	611 ...	280 ...	230 ...	430 ...	2,226

2.—ARE THE SEEDS WHOLLY DIGESTED BY THE TURKEY?

In a previous report prominence was given to this most important point, so that, when visiting scrub areas infested with pear and where Turkeys were numerous, close search was made around their feeding-places, and also adjacent to nests, to ascertain whether the birds rejected the seeds in their droppings. Regarding this matter, I may mention that I interviewed several farmers, who were emphatic in their assertion that the Turkey was guilty of spreading the pear, but their only proof was the fact that the birds consumed the fruit and that the pear was spreading in the scrubs.

An excellent opportunity was, however, afforded of securing reliable data on this point from the fact that a Turkey was to be found in captivity in the Rockhampton Botanic Gardens. Mr. Simmonds, the curator, very kindly arranged to supply this bird with ripe pear fruit and note results. Although two sugar-bags of fruit were consumed, no seeds were to be found in the droppings or on the surface of the soil in the small enclosure.

The fact that seed was to be found in the intestines of three of the birds examined is undoubtedly suspicious, but as those were in every instance in close proximity to the gizzard, it is very probable that they were ejected by that powerful organ when the bird was shot.

The following extracts from communications received by Mr. P. V. Maloney, secretary Native Birds Protection Society, Rockhampton, bearing on this point, are of interest, viz. :—

From Mr. H. C. Macarthy, Gogango :—" I have taken pains to thoroughly examine those birds shot in the district, and find that they are at present largely feeding on the fruit of the pear. On opening them up I found the crop and gizzard full of pear seeds, but apparently nothing passes the powerful crushing gizzard, as all matter in the intestines was reduced to a paste."

From Mr. P. F. Madconald, The Range, Rockhampton :—" I have, during the past sixty years, while I lived at Yaamba, continued to rear and make pets of these valuable birds (Turkeys), and carefully watched the result, and always found them quite harmless of the charges attributed to them (spreading pear)."

3.—GERMINATION TESTS CARRIED OUT WITH PEAR SEED.

Tests were made with those obtained from the crop, gizzard, and intestines of the six birds, as well as from seeds obtained from ripe pear fruit. Seeds that had passed through the Turkey were not to be found. Each lot of seeds was kept separate in the tests. The results have been tabulated, however, according to the respective organs.

Two methods of testing were adopted—viz., blotting paper "tray tester," and under ordinary soil conditions. Ten seeds were taken from each lot for the "tray tester," the balance being planted in a plot of land shaded by the branches of an adjacent tree, and protected from vermin by bird netting. No rain having fallen since the commencement of the test, frequent waterings had to be resorted to, the soil being kept moderately moist.

For comparison, a test was carried out in both tester and soil with seed obtained from ripe pear fruit. This was of interest, as it is generally believed that pear seeds will not germinate for years unless they have passed through the digestive tract of an animal or bird.

RESULTS OF GERMINATION TESTS.

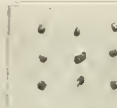
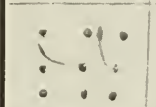
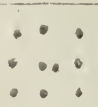
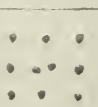
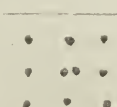
Commenced 22nd July, 1918, to date 20th November, 1918.

Percentage Germinating.			Sept.	Oct.	Nov.	Total.	Grand Total.
Crop	Tester	...	2	24.0	.4	30.0	} Crop ... 14.5
	Soil	..	...	.9	4.7	13.7	
Gizzard	Tester	...	...	1.6	3.4	5.0	} Gizzard ... 6.7
	Soil	...	...	5.9	1.0	6.9	
Intestine	Tester	...	...	...	...	...	} Intestine 0.7
	Soil	...	...	0.8	...	0.8	
Check— (Pear Fruit)	Tester	...	...	85.0	5.0	90.0	} Check ... 62.5
	Soil	...	...	46.0	10.5	0.56	

Attached herewith is a photograph of the tray tests taken on the 29th of October:—

GERMINATION TESTS WITH PRICKLY PEAR SEEDS FROM SCRUB-TURKEYS
AND RIPE PEAR FRUIT.

Test commenced 11th July, 1918; photographed 29th October, 1918.

—	Crop.	Gizzard.	Intestine.	Seed from Pear Fruit.
Turkey No. 1 ..				
Turkey No. 2 ..				
Turkey No. 3 ..				
Turkey No. 4 ..				
Turkey No. 5 ..				
Turkey No. 6 ..				

It was noted that a large proportion of the seeds obtained from the gizzards and intestines were considerably worn down, many being chipped and broken. To this fact may be attributed the low germination so far recorded of the seeds taken from those organs.

DEDUCTIONS ARRIVED AT.

It will be noted from the investigations carried out that the Scrub-Turkey is not, as alleged, an active agent in spreading prickly pear. However, should evidence be forthcoming to the contrary, it will be carefully inquired into.

In regard to the germination tests, unless advised to the contrary, those will be discontinued at the end of the present month.

GENERAL OBSERVATIONS.

In carrying out the soil tests, it was noted that when the plants were about an inch high the leaves were eaten off, by what agency I was unable to ascertain.

It was also noted that the young seedlings are very delicate. Exposure to sun and high temperature shortly after germination will cause them to shrivel up close to the soil and fall over, the leaves remaining green for some time after.

When the enormous crop of pear fruit that is produced annually is taken into consideration, the fact that the seed germinates readily is of interest. Much of this seed is transported over considerable stretches of country by floods and heavy rains. Fortunately, a very large proportion of the resultant plants must perish shortly after germination, the factors above mentioned contributing largely to this end.—*Queensland Agricultural Journal*, January, 1919.

Notes on Chestnut-rumped Ground-Wren (*Hylacola pyrrhopygia*, Vig. and Hors.)

By P. A. GILBERT, R.A.O.U.

BROADLY speaking, the distribution of the Chestnut-rumped Ground-Wren extends from the coastal regions of New South Wales into Victoria. It is, however, most numerous along the sandstone ridges of the County of Cumberland, N.S.W., where it is resident, and which constitutes its breeding haunts. I have seen odd pairs at Ourimbah, 56 miles, and at Dora Creek, 80 miles north of Sydney, and also on ridges of the Barrangary Mountains, near Moss Vale, about 100 miles south. Around Sydney this species shows a decided preference for the sandstone areas clothed with the numerous representatives of the orders of plants *Proteaceæ*, *Rutaceæ*, and *Epacridaceæ*, including the stunted apple-tree (*Angophora cordifolia*). Very few species of other birds are to be found in the localities frequented by *Hylacola pyrrhopygia*. Of the two sexes the male is the bolder, and when one has mastered his call notes he can be lured out into the open with ease. In the springtime, when breeding is in full swing, I have induced him to come within a yard or two, and once when I had captured a young bird which had just left the nest I imitated his call and simultaneously made the young one squeak, which tactics succeeded in bringing him within hand's reach. He was indeed a beautiful specimen, and all the while I held the youngster he ran around me whistling at his best. Personally, I consider him to be one of our sweetest and most melodious songsters. He is an exquisite mimic, the birds whose notes I have identified so far being the Fan-tailed Cuckoo, Rufous-breasted Whistler, Yellow-breasted Whistler, Grey Shrike-Thrush, and the Spine-billed,

Tawny-crowned, and White-bearded Honey-eaters. The notes of these birds are intermingled with those of his own, more especially during the breeding period. This mimicry, too, is the best indication that nidification has commenced. The female is always exceedingly shy, and, almost needless to say, is a visual nonentity in the breeding season. However, both sexes are habitually cautious, and while they are foraging in the undergrowth for some entomic morsel they are ever on the alert, and never neglect to ascend to some vantage-ground from whence they can see that no enemy is lurking round. More usually the male assumes this responsibility, and if "all's well" frequently gives forth his magnificent song, but should an intruder be lurking around he gives a warning note, and both make themselves scarce the while. Sometimes the female creeps up to watch for any prospective enemy, and should "no enemy" be in sight utters a few clucks, and both resume their foraging together: but she, too, gives a warning note similar to that of the male, when they both disappear into the thickest part of the undergrowth. In the late winter and early spring, when the male is in full song, he frequently ascends a small sapling to 10 or 15 feet to give forth his liquid notes, but never leaves the foliage, and descends as he arose.

The nest, which is a domed structure, is either placed on the ground or up to a foot off it, and is usually constructed, outwardly, of coarse bark and grasses securely woven together; inwardly, of finer materials, and lined with down and feathers of other birds or very fine bark. If the nest is raised from the ground the entrance is more towards the top, but when on the ground it approximates that of the Speckled Warbler (*Chthonicola sagittata*). The female appears to do all the building. At Roseville, N.S.W., during March, 1916, I saw a female carrying bark to a nest half built. It was placed under a broken dead branch of a eucalypt lying on the ground among stones and stunted undergrowth. The male stood by as she worked at it, and dodged here and there whilst she went in pursuit of more material. The next time I visited the nest I found it lined, but apparently deserted, as it was saturated with moisture—the results of a heavy downpour. This is the only instance of autumnal nidification that I have come across.

Three eggs form the normal sitting; they vary in ground colour from purplish-buff to a brownish-buff, with either a cap or zone of much deeper tone on the larger end. They are lustreless or slightly lustrous, with the grain inclined to coarseness for such small eggs. The shape varies from elongate-oval to a roundish oval, the smaller end being somewhat pointed in some specimens. They are usually zoned, but occasionally the capped specimens are met with. The former have freckles and spots in varying intensity from the zone outward, diminishing as they reach the smaller end. The latter are rarer and more handsome, and are generally of the brownish-buff type, with very few surface

markings, the pigment being concentrated in a cap of intense sepia, the centre of which is of the deepest hue, and graduating in tone till it becomes lost in the general ground colour of the shell. Again, some eggs have underlying markings of a faint purplish colour, whilst others are entirely devoid of them. This species is the foster-parent of the Fan-tailed Cuckoo (*Cacomantis flabelliformis*).

The breeding season commences in July and continues till November, or possibly later in favourable seasons, when one or more broods are brought forth. Odd nests may probably be found in the autumn. The following data will amply verify the period mentioned.

On 24/7/1910 I was with Mr. H. Kean, R.A.O.U., at Waterfall, N.S.W., when he found a nest containing a set of three eggs. The nest was placed 6 inches from the ground in a stunted *Angophora cordifolia*, surrounded by a low thicket of other growth. The outer part of the nest was composed of fragments of a coarse rush-like material, the inside being chiefly of fine bark, and the bulk of the lining was of feathers of the Rosella (*Platycercus eximius*).

On 29/8/15 I was accompanied by Mr. Kean when I found a nest tenanted by three young about 10 days old. This was out from Pymble, N.S.W. The nest was placed in the centre of an *Isopogon aneathifolia*, one foot from the ground. It was composed outwardly of dry grass intermingled with lengths of a wiry vine growth, the lining being of very fine shredded bark.

On 21/9/1913 my brother, Mr. R. J. Gilbert, drew my attention to a nest he had found. This one was at East Hills, N.S.W., and was placed on the ground under a dead branch of a eucalypt, the occupants being three young, four or five days old. The opening of this nest was flush with the ground. After waiting a few minutes I saw the female go in with a small green caterpillar. An hour's observation gave me ample opportunity to identify the insects served up to the young. Small green caterpillars and white grubs were most frequently brought in, while every now and then the menu was varied with small moths and flies. The young displayed wonderful instinct at this tender age, for every time the parent bird approached a chorus of squeaks was heard when it was about 2 feet away.

On 24/10/14, whilst walking along a ridge near Sutherland, N.S.W., a female flew up at about 5 yards in front of me. I continued to walk on, and before I had traversed another 15 yards she flew up again, so I decided to make a search for a nest. After zigzagging back across the path I had come I succeeded in finding a nest containing three fresh eggs. From her actions I concluded that she was bent on enticing me away from the vicinity of her nest. The nest was on the ground under a tussock of grass in the midst of other undergrowth; the outward part of the structure was mainly of grass, and from the copious lining of feathers I could identify those of the Lyre-Bird (*Menura superba*), Painted Quail (*Turnix varia*), Tawny-crowned Honey-eater (*Glyciphila*

fulvifrons), and the White-bearded Honey-eater (*Meliornis novæ-hollandiæ*).

In conclusion, I would refer readers to Mr. F. E. Howe's extremely interesting article on the genus *Hylacola* appearing in *The Emu*, vol. xvii., part 2, page 87, which deals exhaustively with the descriptive and taxonomic aspects, and also vol. xviii., part I, page 59, for a description of a new sub-species.

Bell-Birds and Caterpillars.

By A. H. CHISHOLM, R.A.O.U.

IN a recent number of *The Emu* * I recorded some observations on the strangely persistent habit displayed by the Crested Bell-Bird (*Oreoica cristata*) of stocking its nest with hairy caterpillars. I am rather sorry now, in view of the puzzling nature of this practice, that I did not devote more attention to the matter when the opportunity offered during my residence in Victoria. There are no Bell-Birds at all near Brisbane, and I doubt whether there ever have been.

However, when visiting my old district of Maryborough (Vic.) in November last, I made a point of looking for nests of *Oreoica*, and was fortunate enough to find a fine example built into the top of a stump, right alongside a bush road, at a height of about 3 feet. Incidentally, a pair of Shrike-Tits (*Falcunculus frontatus*), which species appears to me to be an arboreal edition of *Oreoica*, and a pair of Shrike-Robins (*Eopsaltria australis*), were weaving their respective dainty homes close by, and in a favourite old orchard a few hundred yards away half a dozen other species were nesting. The Bell-Birds' nest contained four eggs—one more to the clutch than I have usually found—and, sure enough, there was the customary weird assortment of caterpillars. The positions and condition of these larvæ tallied with what has been recorded in previous cases. Some were on the rim of the nest, and others were among the eggs; some were dead, and the rest appeared to be either torpid or very sluggish. As it was too late to do any photographic work that day, I contented myself with the mild experiment of removing practically the whole of the caterpillars. Two days later the nest contained approximately the same number of larvæ, all of which were apparently alive. An attempt made then to photograph either of the wary birds at the nest was unsuccessful; they stayed away too long, and I had to be satisfied with the accompanying picture of the nest and eggs.

The caterpillars thus collected I brought back to Brisbane and submitted to the Government Entomologist (Mr. Henry Tryon), who has favoured me with the following report thereon:—"The caterpillars submitted by you, as obtained from a nest of *Oreoica*

* Vol. xviii., p. 75.

cristata, are examples of three distinct kinds—viz., (1) Kershaw's Painted Lady (*Pyrameis kershawi*), three specimens; (2) *Teara*, sp. (related to *Teara tetropis*, the white cedar moth), three specimens; (3) *Agalosoma*, sp. (related to *A. lauta*, Scott), three specimens. The two last-mentioned kinds of caterpillars evidently are members of the family *Lymantriidæ*. No. 3 is separated from No. 2 in having the head glabrous. The butterfly caterpillars (1) were evidently transferred to the nest by one of the birds, the specimens being flattened throughout their entire



Nest and Eggs *in situ* of the Crested Bell-Bird (*Oreoica cristata*).

FROM A PHOTO. BY A. H. CHISHOLM, R.A.O.U., BRISBANE.

length, suggestive of compression by a bird's beak. The hairy caterpillars (2 and 3) may have been similarly conveyed, but exhibit no marks of injury. Both insects are nocturnal in their habits, and during the day remain congregated in some place of concealment. A bird's nest occurring in a tree where these caterpillars fed would afford the necessary shelter, but arguments might be available to dispose of this possible explanation of their occurrence where met with. I merely mention this point, and do not advance it as an adequate explanation of the presence of the larvæ in the Bell-Birds' nest."

Of course, the fact that caterpillars always occur in Bell-Birds' nests, and not in kindred nests, such as that of the Grey Thrush (*Colluricincla harmonica*), disposes of the suggestion that the birds are not responsible for their presence. Moreover, I have seen a male Bell-Bird carrying a hairy caterpillar both to and from a nest. Mr. Tryon's remarks on the compressed state of some of the specimens submitted lead one to wonder whether the bird squeezes the juices out of the soft body. If so, however, why are the remains not discarded? All points considered, it seems to me that we need much more definite evidence than has so far been adduced before we can accept the rather superficial theory that the Bell-Birds collect these caterpillars for food.

The Singing Honey-eater (*Ptilotis sonora*).

BY JOHN G. MANN, FRANKSTON (VIC.)

SOME remarks in Mr. F. C. Morse's "Nesting Notes from Moree" in last July number of *The Emu* relative to *Ptilotis sonora* lead me to think that possibly he, and others, may be interested to hear my experience of a pair of these birds, indicative of their intelligence and power of memory.

Surrounding my house near Frankston, Victoria, are a few acres of tea-tree and heath scrub, which I maintain as a bird sanctuary, and where I have succeeded in taming many members of several species of the numerous birds which frequent it, until they will come from the bush at call and take food from my hand.

Although there are always considerable numbers of Honey-eaters, such as White-eared, Lunulated, New Holland, Spinebills, and occasionally Wattle-Birds, I have never seen here but the one pair of Singing Honey-eaters. These were first noticed in the spring of 1916, when they built close to the house, and before long became sufficiently tame to come to the verandah for crumbs. By the middle of November, 1916, their two young ones were brought there also, and were fed by the mother bird with crumbs and sugar from my hand. When the young ones, however, were in full plumage, and able to care for themselves, the mother changed her tactics and began persistently to drive them away, until at length they left the neighbourhood for good. Then (in January, 1917) she built another nest in a *Leptospermum* tree adjoining that in which the first nest was made, and in due course reared another pair of young. All this time not a day passed but she came to me whenever I was near by, settled on my arm or hand, and even allowed me to stroke her. The male bird, though fairly tame, never showed quite the same confidence. When their second family was of mature growth it was driven out of bounds, like the first, and disappeared. During the second week in April, 1917, the old birds also disappeared, and nothing more was seen of them for months. On 14th September, how-

ever, as I was upon a ladder near the house, my old friend alighted on my hand and sought for sugar, as though it were but yesterday, instead of five months ago, since she left.

During that season she again reared two families, with almost exactly similar proceeding as in the previous year, and in April, 1918, again disappeared. This time, when September came round, I was on the look-out with much interest to see if she would again return, and sure enough, on the 13th (the year before it was the 14th), the pair arrived. Without hesitation they came at once to my hand. By Christmas their first young were launched upon the world, and as I now write (27th February) the second pair of young are nearly old enough to be driven forth. The old mother bird will now come in through the open window when I call and perch quietly on my thumb while I open the cupboard and dip a piece of bread in the honey for her—a delicacy she dearly enjoys.

It would be interesting to know whither these birds migrate for the five months each year, and also what becomes of their young, for they never return to my domain, and, though I have occasionally seen a few members of the species elsewhere on this Mornington Peninsula, they do not appear in this immediate locality.

As regards their vocal accomplishments, my experience differs somewhat from that of Mr. Morse. The rather high-pitched, musical little bar of several notes, from which I have assumed they derived their name, is given frequently during the whole time they are with me, and the "Preet, preet" only when they call each other. When they want to wean off the first family before their second adventure they use quite a different sound—between a hiss and a snarl, long drawn out—from which the young invariably flee.

The Nesting of Lyre-Birds.

BY H. V. EDWARDS.

It was remarked in *The Emu* for January that the Lyre-Bird, as evidenced at times by its selection of nesting-sites, does not exhibit any particular shyness. I also have found the nest of this bird on a low stump within 20 yards of a main road, and in full view of it. As regards the bird's general nesting habits, Mr. Gregory Mathews remarked some time ago (in the *Sydney Mail*, I think) that, since the increase of foxes, the Lyre-Bird had taken to nesting on tall stumps, cliffs, and in other elevated positions.

Long before the introduction of this animal I have found Lyre-Birds' nests about creeks on the outskirts of Tantawanglo Mountain (between the Monaro and Bega (N.S.W.) districts), and at Mittagong, about 70 miles south of Sydney, built on cliff ledges and stumps. The bird is naturally erratic in the choice of a site

for its large and conspicuous nest. I have found it among ferns and undergrowth on the margins of mountain creeks, on logs and low rocks in open forest country, destitute of any cover; on the top of wild vines; at the foot of large tree-ferns, and in the crown of tall ones; while in one instance the nest was discovered in the fork of a tree over 18 feet above ground.

The female exhibits no shyness when there is a chick in the nest. While examining a young bird I have seen the female scratching about contentedly not four yards away. Indeed, when the young bird, on being handled, uttered its piercing call, the watchful parent, moved by that "mother-love which is stronger than the fear of death," came fussing distressedly around my feet. The male, however, kept at a safe distance, merely exhibiting himself occasionally on a low tree-branch or log, with his fine tail spread. In one instance I found a grub, probably the larva of a sarcophaga, or carnivorous fly, attached to the beak of a young Lyre-Bird, near the root. This parasite, however, disappeared before the chick left the nest.

As the Lyre-Bird is most at home about gullies in dense scrubs and remote mountain ranges, it should be in no danger of extinction. Its chief enemies are the "tail hunter" and the fox. The latter, I think, often disposes of the Lyre-Bird chick while in the nest.

The Kookaburra.

By J. T. RYAN, PARKVILLE (VIC.)

(Communicated by Mr. D. Le Souëf, C.M.Z.S.)

DURING the last few months I have seen several articles appearing in the *Argus* condemning this bird as an outlaw. Mr. Tom Fisher, of Ercildoune, says he creates a lot of havoc by eating our small insectivorous birds and robbing their nests. Well, I have spent most of my life in the bush—that is, about 30 years—and I have never seen the Kookaburra kill a small bird or interfere with their nests. I have always been a keen observer of nature and studied the habits of most of our native birds, and always looked upon the Kookaburra as one of the best birds we have in Australia. I have seen him killing snakes up to 3 feet long on several occasions. His method of doing so was to pounce on the snake and secure a good hold of it just behind the head, about 2 inches back from its fangs; then it would get up on the branch of a tree and beat the life out of it on one of the limbs, but never for a moment relaxing its hold on the snake. Sometimes another Kookaburra would get hold of the snake's tail and also drive his strong bill into the body of the snake—in fact, I have seen as many as four Kookaburras at the one snake, but the one that had the snake by the head never let go his hold until the snake was dead. Sometimes the snake would coil around the neck

of the Kookaburra, but with the aid of its wings it would nearly always prevent the snake from getting a coil around its neck and free itself quickly. On one occasion I noticed a pair of Kookaburras had a nest of young ones in the hollow of a dry tree; underneath the tree, in a small shrub growing on the bank of the stream, was a nest of the Black-and-White Fantail, with the female bird sitting on the eggs. After a time the young ones hatched, and I have watched the birds feed their young until they left the nest. Now, if the Kookaburra is such a demon as they class her on our small birds, why did she not take the young of the Fantail which was under her eyes constantly, not 20 feet away from where she had to procure food for her own young? I noticed also that small birds of several varieties were numerous around this locality, and they all seemed to rear their young and were never molested by the Kookaburra. I noticed that the Kookaburra feeds its young on grubs of all sorts, small snakes, mice, lizards, worms, and various other insects, but never on any occasion have I seen them bring a small bird to feed their young on.

From my personal observation of the Kookaburra and what I have seen of this bird I look upon it as most valuable as a snake-destroyer. For years I have had constant opportunities of studying its habits, so until I see him doing the mischief to small birds that he is supposed to do I will always look upon "Jacko" as one of my friends. I had an interview with Mr. D. Le Souëf on the subject of the Kookaburra destroying small birds. He is mostly of the same opinion as myself. I consider the Boobook Owl and the Butcher-Bird—or, as it is familiarly called, the "Derwent Jackass"—account for a good many small birds, and probably young, as well as the rats and mice they kill. I hope your Society will give the Kookaburra their best protection, and would be very sorry to see him classed as an outlaw.

An Unidentified *Petroica* (Australian Robin).

BY H. V. EDWARDS, BEGA, N.S.W.

A CONSIDERABLE time ago—about the eighties—I became acquainted, at Mittagong, N.S.W., some 70 miles south of Sydney, with a Robin which had the peculiar habit of nesting on piles of horse or cattle manure, or on clods of earth, and occasionally in the banks of creeks—never, to my knowledge, in a tree.

My interest in this bird was renewed by the publication, two or three years ago, in the *Sydney Mail*, of a nature story paragraph in which the peculiar nesting habit of this Robin was referred to. It was described as "one of the *Petroica* species," but neither specific name nor habitat was assigned it by the writer. The sexes are alike, and closely resemble the female of the Scarlet-breasted Robin (*Petroica leggeti*), but neither male nor female

has trace of colour in the breast. The nest is cup-shaped, and usually woven of soft stringy-bark, like that of the Scarlet-breast; eggs three in number, and greyish-white in colour, spotted with brown.

It has been suggested by experienced bird-observers that my Robin was a *Petroica* nesting out of breeding plumage. This suggestion is negatived by the fact that the *Petroicas* do not nest in this peculiar manner, and that the nest of my bird was found several times about Mittagong, in open timbered country, and about creeks in the ranges. Further, the Robin to which I refer has a strikingly large eye, tinged, I think, with pale yellowish-white.

It was also suggested that the bird might be the Scrub-Robin (*Drymodes brunneipygius*), but it does not even faintly resemble this species, and the Scrub-Robin does not nest in this peculiar fashion, while the Tasmanian Dusky Robin does not come so far north, and, further, in breeding habits and other points does not answer to the description.

I fancied I afterwards saw this apparently unidentified Robin about creeks adjacent to the Snowy River, in southern Monaro, but am not sure. On first discovering a pair of these Robins, which, from their behaviour, evidently had a nest close at hand, I searched on trees, stumps, &c.—everywhere, in fact, but the right quarter. Eventually, the persistence of the birds in returning again and again to a heap of cow manure induced me to examine it, the nest being found built on the highest part of the pile.

A New Trait of the Goldfinch.

By H. STUART DOVE, F.Z.S., DEVONPORT, TAS.

MR. Arthur Mattingley's pleasant note on the Spinebill (*Acanthorhynchus tenuirostris*) in *The Emu*, vol. xviii., p. 209, was read with much interest. Many times have we watched this spruce little Honey-eater poised before a bunch of fuchsia or salvia blossom, dipping his slender, curved bill into each flower while remaining suspended on rapidly-vibrating wings. From this clever device the bird is often known, not inaptly, as the "Tasmanian Humming-Bird." But a few weeks ago I was much surprised to see that the introduced Goldfinch (*Carduelis carduelis*) was learning a similar trick for obtaining sustenance. Some white cornflowers (*Centaurea cyaneus*, var.) had protruded their heads through a picket fence, and a Goldfinch, in the absence of any support on which he could place his feet, was suspended on the wing while pulling with his beak at the florets in order to obtain the ovules at the base of these. This Finch is exceedingly fond of the cornflower seed, whether immature or ripe, and it is difficult to collect any from the plants when a flock of this handsome species is in

the neighbourhood. Any small mischief which is done in this way can be readily forgiven both on account of the beauty and grace of the bird and the good which it does in destroying large quantities of thistle and other weed seeds.

While watching our little friend feeding at the cornflower in the suspended manner just described, one could not help speculating as to whether a second species of "Humming-Bird" was in course of development in our island.

Stray Feathers.

Finches and Grass-Parrots.—It is interesting that Finches seem to prefer the hot drip from sun-heated pipes to reservoir water. They come in hundreds to the hot pipe, though the big water-hole is but 200 yards distant. It is evening as I write; about 500 Bee-eaters are all flying up and down around a tree close to the home, evidently going to roost in it. At the reservoir, in the dry weather, thousands of Warbling Grass-Parrots (Budgerigars of the trappers) watered in large flocks. The Black-tailed Native-Hen is sometimes around the water-holes. The season is dry, but patchy rains have fallen, which are not sufficient to warrant the birds going back to the rivers.—J. R. CHISHOLM. The Plains, Prairie Table-land, North Queensland.

* * *

Cuckoo Seen with Egg.—Arthur P. Ingle, late of Rosedale, Victoria, who was a keen bird-observer and enthusiastic oologist, was killed while fighting with the Australian troops at Passchendaele, in Belgium, on 12th October, 1917. His collection of eggs, by the generosity of his father, passed into my possession. It contained a clutch consisting of two eggs of a Blue Wren-Warbler (*Malurus cyaneus*) and one egg of a Narrow-billed Bronze-Cuckoo (*Chalcococcyx basalis*), which he had taken, and which is worthy of special notice because of the rare instances of authentic records of a Cuckoo being seen with an egg. The notes with this clutch contain the following particulars:—"I saw the Cuckoo take the Wren's egg away in her bill after having deposited her own in its place."—J. A. Ross. Malvern, 1/3/19.

* * *

The Spine-tailed Swift (*Chætura caudacuta*).—The variation in number of these fine birds in different seasons is very remarkable. During January, February, and March, and great part of April, 1917, they were seen in numbers, appearing at all altitudes—from 20 feet to the limit of visibility. Last summer (1918) not a bird came within my ken, although I was constantly on the look-out. Some were seen by a friend in April, apparently just about to leave for the North. This summer the same non-success

has, so far, attended observations: one individual was noted on 12th January, flying at a tremendous pace, as if seeking companions, but none has been seen since. The season has been dry and windy, with a cold snap during the fourth week of January, when snow fell on the Tiers within sight of Devonport; since then we have had a good deal of heat.—H. STUART DOVE. Devonport, Tas.

* * *

Snakes and Young Birds.—A tragic episode, as far as the Orange-tipped Pardalote (*Pardalotus assimilis*) was concerned, was perpetrated by a Brown Snake (*Diemenia textilis*), 4 feet 6 inches long. On the 13th October, 1917, at Blacktown, N.S.W., I was walking along the bed of a dry creek when I came upon a male darting down and up again, and on looking over in its direction I saw the tail end of a snake dangling from a hole in the bank. I promptly despatched the snake, and on examination I saw that it had gorged two young Pardalotes which were fully fledged; the third was in the process of serving the same fate, the fourth was dead in the nest, and the female was dead in the burrow, she evidently being crushed in her struggles to escape. There is not the slightest doubt that many of our small ground-frequenting birds succumb to these insidious and lethal reptiles.

* * *

Rare Birds.—Owing probably to the drought in other quarters, certain rare nomadic birds have visited the Bega (N.S.W.) district this summer. The Great White Egret and Yellow-billed Spoonbill have appeared about the lagoons and ponds, and, on the outskirts of the town of Bega, I observed a White-necked Heron feeding about a mud-hole excavated for water in the bed of a swamp. The Regent-Bird (also very rare in this quarter) appeared in January, and also the "Barley-Bird," or Fantail-Warbler. The latter sometimes appears on Monaro highlands in summer. I have found the cosy nest in Californian thistles, then grown tall and crowned with perfumed purple flowers. Of South Coastal (N.S.W.) birds I think two of the rarest are the Little Bittern and the Pilot-Bird. I have observed the latter twice in dense scrubs near the sea, and the Little Bittern once only, on the mud flats of an estuary. About two years ago a Painted Snipe was shot on the margin of a Monaro river, but it is very rare in that quarter.—H. V. EDWARDS.

* * *

Powerful Owl and Ring-tailed Possum.—During my frequent visits to the hut at Selby, I had heard the call of this bird, but seldom saw it. What was my joy, on a recent week-end, when investigating the excreta under the big trees in the gully, to see a pair of these birds in the early afternoon perched about 40 feet above ground in a rough-barked messmate! Closer investigation

showed that one of the birds held in its claws the remains of a ringtail possum, which it had evidently caught the previous night and retained for another meal. All attempts by shouting failed to make it fly, and it was only by hammering the tree-trunk with a big stick that it was induced to vacate its position. The possum was not dropped in its passage to another tree, but remained dangling from its claws during flight, and was placed on another limb and again stood on by the bird. The third and even fourth flushing had a like result, and, when my boy and I left the bird to its own reflections it was to see it bowing and nodding sedately as we took our departure, as if to say, "Now are you satisfied?"—TOM TREGELLAS. 27/1/19.

* * *

Red-headed Woodpecker (*Melanerpes erythrocephalus*) and its Nest.—Only 14 yards from the back door of Mr. Hammond Brown's house, near Baltimore, one of these Woodpeckers had made its nest. I was interested in watching it go in and out of its hole. The hole was bored in a dead bough about 40 feet from the ground, was circular (about $1\frac{1}{2}$ inches in diameter); it goes $2\frac{1}{2}$ inches in a horizontal direction, and then 12 to 18 inches down, somewhat enlarged at the bottom. The eggs are laid in the chips. The chips were sound wood, and Mr. Brown told me that the bird occupied only $1\frac{1}{2}$ days from start to completion of this nest—truly, I thought, a remarkable feat, considering the hardness of the timber. The bill strikes one as shaped like a narrow chisel, sharper in this species than is the case with many American Woodpeckers, but blunt compared with a carpenter's tool, and yet the bird I was watching had done all the work in the brief time quoted. I met with four or five species of Woodpecker in the Baltimore (Maryland) woods, and in every case the blows, instead of being sledge-hammer-like, were extremely rapid; nevertheless, the method seems to be effective.—EDWIN ASHBY. "Witunga," Blackwood, S.A.

* * *

City Observations.—We have been interested during the past few months in a pair of Blue Wrens which have just reared their fourth brood for the season in a small garden in the grounds of the old Treasury, Spring-street. The positions chosen for the nests were not more than 30 feet from perhaps the busiest tram-line in Melbourne, and separated from it only by a picket fence. All four nests, though in different positions, were built of the same material, which was removed by the female after the departure of each brood. The male did not assist in the work of incubation, but, up to the last nest, took his share of the feeding duties while the young were in the nest, and assumed full control of them when they left it. While he fed the fledgelings in the gardens about, the female laid and incubated the next clutch of eggs. The last nest we watched closely from day to day, and also

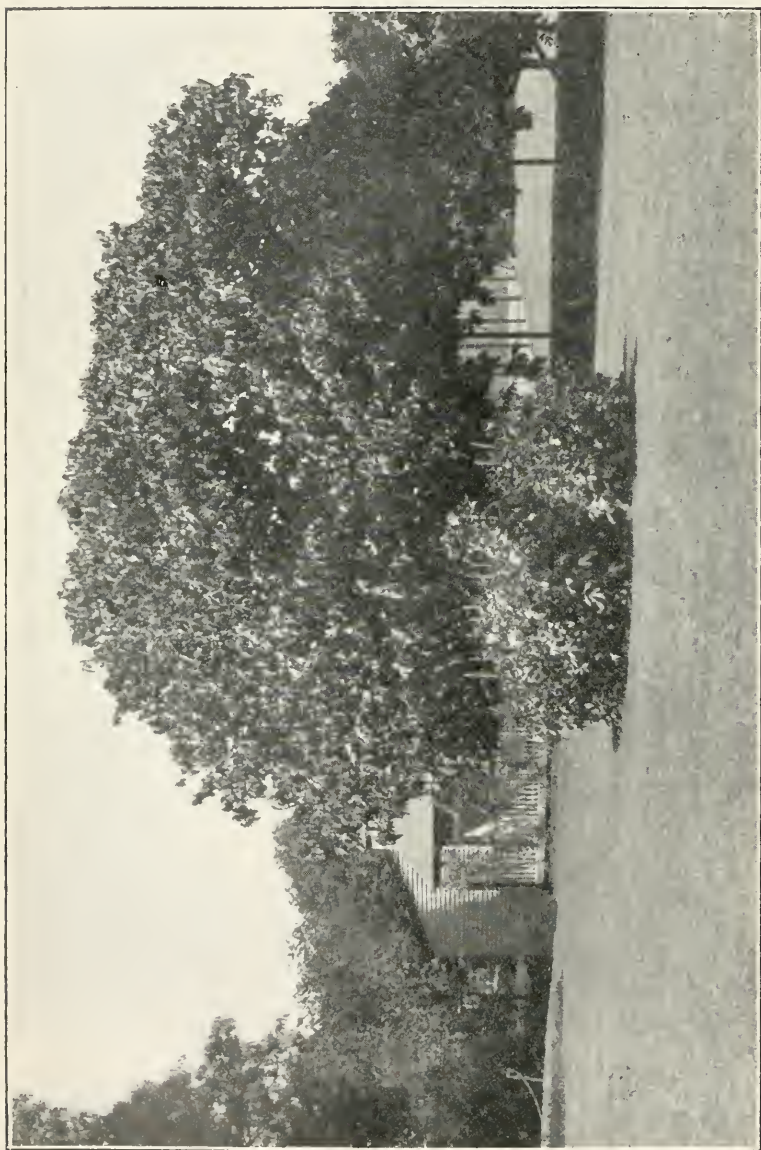


Fig-tree at Belltrees, N.S.W., which provides food for many birds during drought.

obtained a couple of photographs early one morning. When three of the four eggs in the last clutch hatched we were surprised to find that, in addition to the female parent, three surviving young ones from the first two broods assisted in feeding, while the male fed the young from the third brood, and was seldom seen near the nest. The three young ones first mentioned appeared to have just as deep an interest in the nest as had the parent—in fact, we were quite unable to say which was the parent. When faced with the camera all four brown birds became very noisy and excited. Altogether, the pair successfully reared seven birds—two from the first nest, one from the second, three from the third, while one only survived from the last nest. We may add that, although we have had considerable experience of the Blue Wren, our observations have not led us to believe that the male has more than one mate, as appears to be the popular idea. We rather think that the sociability of the birds, both with members of their own family and with others, accounts for this belief.—R. T. LITTLEJOHNS and S. A. LAWRENCE. Melbourne, 30/1/19.

* * *

Birds and Drought.—The present disastrous drought, one of the worst experienced in the Upper Hunter River district, is having a curious effect upon the habits of many native birds. Budgerigars (*Melopsittacus undulatus*), previously very rare visitors, are now with us in thousands, while the White Egret (*Herodias timoriensis*) and Pacific Heron (*Notophoxyx pacifica*), scarcely known before, are plentiful along the river. The large Black Cormorants (*Phalacrocorax carbo*), usually confined to odd birds, are very numerous, and playing sad havoc with fish. Streams being low and water clear give the Cormorants every opportunity for capturing fish of all sorts. I have lately examined dozens of *P. carbo*, and in every case found fish, chiefly perch and mullet of various sizes, in the birds' stomachs. One partly-digested perch (*Lates colonorum*) weighed $\frac{3}{4}$ lb., while another of the birds disgorged an 18-inch eel. Whatever may be the habits of *P. carbo* in salt water, there is not the slightest doubt that it does an immense amount of harm in inland streams during dry seasons. My most interesting visitor of the drought season was a single specimen of the Red-crowned Fruit-Pigeon (*Ptilinopus swainsoni*): a female was found disabled near the tennis court, having flown into the wire-netting, apparently. The stomach was full of pepper-tree (*Schinus molle*) berries. During the present drought birds practically cleared the orchard of all fruit except grapes, which were protected by paper bags. The Yellow-mantled Rosella (*Platycercus splendidus*) commenced operations on the unripe stone fruit, and, though about 150 of the birds were shot, they fully accounted for apricots, peaches, nectarines, and plums, afterwards finishing off the apples, pears, and quinces. *Myzantha garrula*, *Ptilotis penicillata*, *Zosterops*

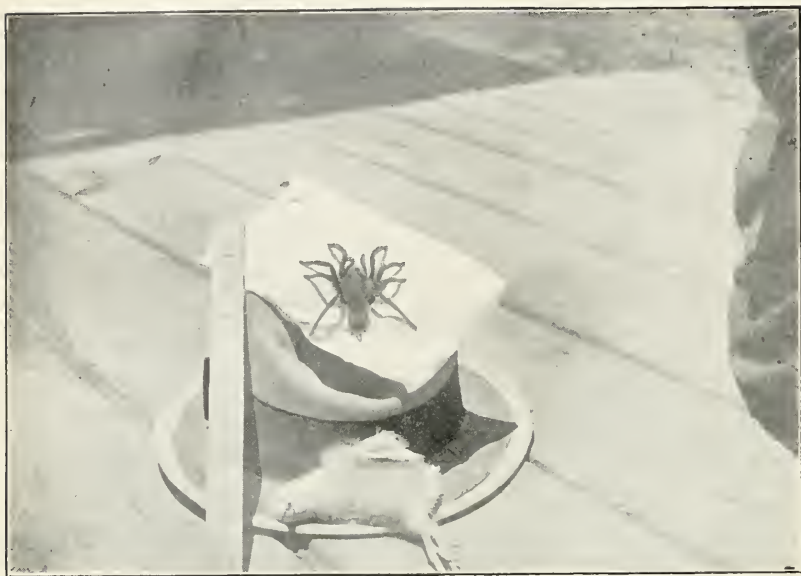
caerulescens, and *Corone australis* likewise caused trouble. The imported fox was in evidence, eating water-melons, tomatoes, and any low-hanging fruit; however, a Rosella baited with strychnine was irresistible, and baits of this sort soon accounted for six of the animals. By the way, a Rosella is, in my experience, the most attractive of all baits for foxes. Foxes were the means of Choughs (*Corcorax melanorhamphus*) learning another bad habit (they already take toll of newly-sown wheat and ripening maize) by teaching them the value of water-melons as a food in time of scarcity. During the raid of foxes upon our melons, numbers of White-winged Choughs were noticed on the melon patch, but no importance was attached to the fact. After the destruction of the foxes by poison, Choughs were still observed feeding on something, an examination proving that they bored neat holes into the fruit and completely extracted the contents. About the same time they attacked fruit growing on a large mulberry tree near by, and assisted the imported Starling (*Sturnus vulgaris*) in clearing the crop. Overhanging my office is an immense fig-tree of the Purple Turkish variety, said to be nearly 100 years old. It was almost destroyed in 1901 by a gale, but has since re-grown to a height of 30 feet, with a spread of branches 50 feet in diameter, the trunk measuring 10 feet 6 inches in girth at four feet from the ground (see photo.) It bears great crops of most luscious fruit, the season lasting from early in January until April, and is naturally a great attraction for birds. Finding that Starlings were invading the tree in numbers, I determined to try the effect of poison. For the purpose I baited a number of figs, tied them to sticks, and placed same near the top of the tree. The first twenty-four hours gave the following results:—Two possums, three flying foxes, four Magpies, two Peewits (Magpie-Larks), one Harmonious Thrush, five Orioles, several *Ptilotis penicillata* and *Zosterops*, with one Starling. I abandoned the experiment and resorted to the .22 rifle, which gives excellent sport and results.—HENRY L. WHITE. Belltrees, Scone, N.S.W., 11/3/19.

Camera Craft Notes.

The Australian Goshawk (*Astur approximans*).—These fine birds are found all over Australia and Tasmania, as well as in New Caledonia. The young are very differently marked from the adults, and much confusion was caused in originally naming them as a different species. The adult birds have fine pencilled markings across the brown breast, whereas the young have somewhat radiated lines, through each feather being crossed by two bands of dark brown, the lower one having a triangular form. These birds, being swift on the wing, are naturally destructive to bird-life, which they frequently take unawares when swiftly gliding through the timbered country where they are naturally



The Australian Goshawk (*Astur approximans*).



Large Spider (*Selenotypus plumipes*) and Chicken removed by it.

PHOTO. BY A. H. CHISHOLM, R.A.O.U., QUEENSLAND.



The Australian Brown Flycatcher on Nest.

PHOTO. BY R. T. LITTLEJOHNS R.A.O.U.

to be found. They are bold, active birds, and seldom let their prey escape them. They can catch the swift-flying Carrier Pigeon. The habits of these birds in Australia are identical with those of America and elsewhere.

* * *

Spider and Chicken.—In the accompanying photograph note the dead chicken and the spider. The latter has a spread (not extended) of five inches. These spiders no doubt destroy much bird-life. The chicken (one of a brood) disappeared. The tracks showed something had been dragged. Following up, we found the chicken 50 feet away. When one of my people took hold of it, there was tugging resistance. Investigation revealed the spider with one of the chicken's legs down a hole. The spider tugged and endeavoured to pull the chicken down its hole, which was about $1\frac{1}{4}$ inches in diameter. To give an idea of the proportions of each, I had them photographed on my hat, with a 12-inch rule beside. Possibly Finches, Larks, and Pardalotes are part of the spider's prey.—J. R. CHISHOLM. The Plains, Prairie Table-land, North Queensland.

* * *

Posing the Sitter.—Photographers of birds have so many difficulties to contend with that any hint, however simple, which tends to overcome them may be acceptable. While photographing adult birds, those sitting on a nest especially, we have often experienced considerable trouble in inducing the subject to take up a suitable position. There appears quite a usual desire on the part of most birds to face the camera directly, in which case the picture will give a very unnatural appearance to the head and bill. A ruse we have seldom found to fail is for one of the party—if there be more than one—to draw the bird's attention from the camera by moving slowly round the nest, or by the operator, if he be alone, carrying out the same purpose by means of a white handkerchief on the end of a long stick. The bird will almost certainly follow the moving object with its eye, and it soon becomes necessary that the subject itself should move in order that this may be done. Especially is this method effective when it is desired that the position of the head only be altered. The picture reproduced illustrates this point. The Brown Flycatcher photographed persisted in facing the camera, and once it had settled down comfortably nothing would move it. Afterwards, however, by moving around as described, before the subject had time to settle down on the eggs, we were able to obtain pictures in the position shown.—S. A. LAWRENCE and R. T. LITTLEJOHNS. Melbourne, 30/1/19.

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The Moulting of Penguins.—It is interesting to notice how quickly Penguins are able to shed their feathers, but we have to remember that during that time they do not enter the water, and therefore have to do without food; hence the necessity of a quick moult.

On the Macquarie and other Antarctic islands they congregate in immense numbers—in one case well over a million birds—to go through the necessary process. They seem to take off many of the moulting feathers with the help of their bills. The feathers of the upper portion of the bird seem to come off first, and in patches, more or less, the whole process taking about a week, and the last to be discarded seem to be those of the tail. The illustration shows those moulted in one night only from a specimen in the Melbourne Zoological Gardens of the Royal Penguin (*Eudyptes schlegeli*), from the Macquarie Islands. It is difficult to realize what an immense number of feathers must be shed, say by a million birds, and how matted the soil must be with them. Then we have to remember that this goes on year after year, and must affect the character of the soil of the rookeries, in course of time, as they get mixed up with the mud and slush.—W. H. D. LE SOUËF, C.M.Z.S. Zoological Gardens, Parkville.

* * *

Tawny Frogmouth (*Podargus strigoides*).—Probably no perching bird is more difficult to detect than Frogmouths. They almost invariably sit lengthways on the bough, and, should any danger approach, stretch their head straight out and partially close their eyes, making their body look exactly like a broken-off bough. I remember, many years ago, when nesting with a well-known medical member of the R.A.O.U., finding the nest of one of these birds, but we both came to the conclusion that someone had found the nest before we had, and had thrown a stick across the nest and probably broken the eggs; anyhow, I climbed up to make quite certain, when, to our surprise, what we thought was a stick flew off the nest, in which was an egg. I am afraid our confidence in ourselves was taken down several pegs at being so deceived, as we both fancied our powers of observation. I have never yet found a female bird sitting either on the eggs or young during the day, but always the male, and the female usually perched in a neighbouring tree; she probably takes her turn at night. The illustration was taken close to the Midpin homestead, near Moree, in New South Wales. Both birds were on the tree, and we only caught sight of one by chance, and the other was not detected until I was taking the photograph.—W. H. D. LE SOUËF, C.M.Z.S. Zoological Gardens, Parkville.

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I HAVE always found it a somewhat hazardous undertaking, from an artistic viewpoint, to photograph a bird among green leaves while the sun is shining strongly. Particularly is this the case in regard to fruit trees, the leaves of which glint and gleam under the influence of the sun in a manner most inimical to photographic effectiveness. This factor has interfered on several occasions with attempts I have made to secure good studies of the White-shouldered Caterpillar-eater (*Campephaga humeralis*), and in November last it operated in respect of a pair of Scarlet-



A Penguin moulting at the Melbourne Zoological Gardens.

PHOTO. BY D. LE SOUEF, C.M.Z.S.



Feathers moulted in one night by the Penguin figured above.

PHOTO. BY D. LE SOUEF, C.M.Z.S.



Two Frogmouths in the picture—find them.

PHOTO, BY D. LE SOUEF, C.M.Z.S.

PLATE L.



Scarlet-breasted Robin (female) on nest in fruit tree (Victoria)



Black-faced Flycatcher (female) perched above nest (Queensland).

breasted Robins (*Petroica leggii*) which had their trim little nest in an apple-tree in the orchard of Mr. C. P. Kinane, at Lilydale (Vic.) The accompanying picture—the best result of several exposures—is not intended to illustrate this point, however, so much as the trust of a bird when it is treated with consideration. Both Mr. Kinane (who, as one of the journalistic “Woodlanders,” will be remembered in Melbourne as an enthusiastic bird-photographer of other days) and his good wife are on fraternal terms with the bush-birds, and, as a natural corollary, these Robins evinced but little fear of the camera. In most cases a bird will fly off at the click of the shutter; but on this occasion I was able, with the camera close to the nest, to photograph the little mother, change the slide, secure a fresh focus, and take another study, without causing the sitting bird to leave the eggs. The picture shows with what keen attention, however, she watched the strange proceedings.

The study of the Black-faced Flycatcher (*Monarcha carinata*) represents another unusual event in the photography of wild birds. This species was found by the Brisbane Field Naturalists' Club to be very numerous in the thick, damp jungle of the Macpherson Range, when that splendid bird country (which has been reserved as a National Park for Queensland) was visited by club members from last Christmas to New Year. On every part of Mount Bithongabel, which looks almost sheer down, from a height of nearly 4,000 feet, into New South Wales, the strenuous “Why-you! whit-choo!” of these birds could be heard. Only one nest was found, however, and that by accident. It was an exceedingly pretty bird-home, the dark green, mossy tendrils which mainly comprised the material harmonizing splendidly with the obsessing greenness of the surrounding vegetation. The fork of the pliable branch on which the nest was placed was only about 7 feet from the ground, and undoubtedly the opportunity for photographs would have been excellent had it not been for the poor light in the tangle, even at mid-day. Lacking the reflective mirror which is so favoured of Mr. Herbert K. Job* and other American bird-photographers, it was impossible to take instantaneous pictures, and, as any attempt to get the nest into brighter light would have menaced the callow young, there was nothing for it but to try “time” exposures. To photograph a bird in this way as it sits *on* the nest is not remarkable, but this was the first occasion on which I have been able to take a “time” picture of a bird as it perched *above* a nest. The trustfulness of the Flycatchers was due, of course, to the fact that there is very seldom human intrusion into those lonely wilds. Incidentally, the birds were a devoted pair; both paid close attention to the young ones, and on several occasions the male fed the female at the nest, after the fashion of *Eopsaltria*.—A. H. CHISHOLM. Brisbane, February, 1919.

* “The Sport of Bird Study.”

Correspondence.

CORMORANTS : ARE THEY PESTS OR OTHERWISE ?

To the Editors of "The Emu."

SIRS,—An article appearing under the above heading in the October, 1918, number of *The Emu*, by Mr. W. T. Forster, is intended, if I read the author's meaning aright, to suggest that the Cormorant—or Shag, as the bird is better known to me—is a wholesale destroyer of a staple article of human food, and that it should be regarded as a thing of evil. It is only fair, however, to Mr. Forster to mention that at the conclusion of this article he states, in the frankest possible manner, that further evidence is necessary before the question can be finally settled.

Nature, in producing that delicate and beautiful poise which characterizes all her works, has never begrudged her children the reward of their toil. That the Shag is a greedy devourer of fish is indubitably true. It is equally true that in so doing the bird is merely taking its wages for holding in check the many forces inimical to the welfare of fish. Nor is this the only beneficent power it wields. The bird, in eating fish, is still further fulfilling its mission by exercising a wholesome and necessary thinning-out of the unhealthy and of the superfluous members of the finny tribe.

The economic value of the Shag is, in fact, little understood, and the method of learning it through its destruction is—as evidenced by an instance I am about to relate which came under my personal observation—fraught with unpleasant consequences. Many years ago, in a certain locality in New Zealand, the local anglers, on observing that the Shag was eating an imported fish, concluded that the bird was harmful to their interests, and decreed that it should die. So the old birds were shot, while the eggs and the young were pushed with the aid of long sticks from the nests in the branches of the *pohutukawa* trees which grow outwards from the edge of the precipitous cliffs which front the sea. The Shag disappeared. Mark the sequel: the repressive influence which the bird had exerted on the increase of crustaceans and of other natural enemies of young fish and of ova having been removed, the fish likewise disappeared.

In 1878, voyaging from England to Australia, I left the boat at Glenelg and journeyed overland from Adelaide to Melbourne, idling along the Coorong, and lingering by the shores of the lakes. There I feasted abundantly on fish caught by blacks. I have been informed in recent years by Australian ornithologists home on active service that there are fewer Shags in this district at the present time than there were when I was there, forty years ago. Tell me—are there more fish?—Yours, &c.,

JAS. BUCKLAND,
Corres. Memb. R.A.O.U., London.

[Possibly some South Australian member can say.—EDS.]

To the Editors of "The Emu."

SIRS,—As regards the diet of Cormorants, which most people consider highly destructive to valuable food-fishes, I may mention that the following assorted *menu* was found in the stomach of a Cormorant shot in the Bega (South Coastal) district of New South Wales this summer, viz.:—Several earthworms, a small brown eel, some fish fry (including those of sea-mullet, which inhabit lagoons and ponds adjacent to the coastal rivers), some frogs, and a young lagoon turtle. Both the lagoon turtle and the brown eel are, it is asserted, themselves greedy devourers of the ova of valuable fishes, while the latter also feeds on the fry, and even on the adult fish itself.

Certain lagoons and ponds in this district, once fairly well stocked with mullet and perch (of the fluvial and an allied species), have become almost entirely depleted of both adult and young fish. Enormous brown eels inhabit these lagoons and ponds, and it is to them that the gradual disappearance of fish is attributed. Very few are taken by hand-line. Thus Cormorants, in some respects, perform a useful office.—Yours, &c.,

H. V. EDWARDS.

Bega, N.S.W.

SOME OF GOULD'S TYPES.

To the Editors of "The Emu."

SIRS,—When in Philadelphia a few months back I had the opportunity of inspecting some of Gould's types.

(*Gilbertornis*) *Pachycephala rufogularis*, Gould.—The type of this bird is marked "Adelaide"; no further details. Probably Gould would call anywhere within 100 miles "Adelaide." The particular locality for this bird—viz., the Mallee north of the main line to Victoria—was then a huge sheep station. Probably the bird was brought in to the great ornithologist, and, owing to the then sparsely populated condition of the colony, no nearer settlement could be designated.

My specimen of adult male I collected near Karoonda on what is known as the Brown's Well, on Paringa railway line, on 9th April, 1913. It is in all respects, except the tone of the grey back, a duplicate of Gould's type. In that specimen the grey of the upper plumage seems to have faded somewhat, due, no doubt, to the fact that his types were all mounted, and suffered from exposure to light during a considerable number of years. The chestnut abdomen and chestnut lores easily distinguish this bird from its relative, *Pachycephala gilberti*, Gould, the lores in the latter species being black.

Platycercus adeluidæ, Gould (Adelaide Rosella).—This was another of our birds of which I was anxious to inspect the type. I found it was a representative of the ordinary form found in

our Blackwood district, and extending from this part of the Adelaide Hills northwards. The back was almost uniformly dull green and black; only an odd feather or so showed any red at all. The breast was the brick to orange-red of our ordinary bird; no suggestion of the high colouring of the sub-species, *P. fleurieuensis*, Ashby.—Yours, &c.,

EDWIN ASHBY.

Bird Protection.

BIRD PROTECTION IN NEW SOUTH WALES.

THE new *Birds and Animals Protection Act*, passed by Parliament at the last session, and which came into force on 1st January, 1919, provides for the protection of all birds and animals except those mentioned in the schedule. These are Sparrows, Silver-eyes, Shags, Crows, Pied Crow-Shrikes, Leatherheads, Garrulous Honey-eaters, Sulphur-crested Cockatoos, Galahs, Pennant's Parrot, Rosella, Blue Mountain Lorikeet, Red-rumped Parrakeet, Wedge-tailed Eagles, Snipe, Gill-Birds, Starlings, all Falcons and Goshawks. It also provides for the absolute protection of all birds except Sparrows, Silver-eyes, Crows, Starlings, and Cormorants in certain districts, including all the county of Cumberland (Sydney and Hawkesbury River), all Government reserves and forests, all inland lakes and islands therein, and also all islands off the coast of the State.

The Act is administered by the Chief Secretary, who is empowered to appoint rangers, who will have all the powers of a police constable for the purpose of enforcing the Act.

Possession of skins, eggs, feathers, &c., of protected birds is prohibited except under licence from the Chief Secretary, and dealing in same and also in live birds is also prohibited except under licence. Sportsmen or dealers for the market are not allowed to kill more than fifty Ducks, or one hundred Quail, or twenty of any other bird, in twenty-four hours. Dealers in live birds must take out a licence each year, at a cost of £5.

The open season for Quail is from the 1st day of February to the 31st of July, but this is varied in specified districts where experience has shown that the birds are earlier or later in nesting. For Ducks the season is from the 1st of February to the 30th of June. The following birds are also allowed to be taken for the same period:—All Pigeons and Doves except the Wonga and Bronzewings, Coots, Moor-Hens, Mallee-Fowls, Pied Geese, Diamond Finches, Zebra Finches, Firetails, and the Red-browed and the Chestnut-breasted Finches.

This Act is a great advance on the previous one. It provides for large sanctuaries throughout the State, greatly reduces the birds that can be killed or caught, brings under licence all dealers, and shortens the open seasons of the game birds. Its effectiveness

will lie in its administration, and in this the police will have the assistance of honorary rangers; while this help will not be very much, it will give station-owners power to enforce observation on their own properties.

QUEENSLAND NOTES.

BIRDS AND CANE BEETLES.

The cause of the birds continues to receive valuable support. Here is what Dr. J. F. Illingworth, entomologist to the Queensland Sugar Bureau, has to say, *inter alia*, in a report just to hand:—"Soon after the first flight of the beetles this year, my attention was attracted by a flock of fowls and Ibises under one of the large rubber trees in the Mulgrave mill yard. They were all actively feeding upon beetles, which were dropping out of the tree. Upon closer observation I saw that there were a number of smaller birds in the branches, and these, too, were eating the insects. Usually, when one of the birds hopped on a twig and secured a beetle, several others were dislodged, and fell to the ground, where they were quickly gobbled. I have followed up this interesting line of observation, with excellent results. Ordinarily, the birds are very timid in this district, because of a lack of energetic protection, and they scatter before one can get near enough to see what they are eating. By approaching quietly, however, with the glasses I have been able to observe most of our moderate-sized birds feeding upon the beetles. It may be interesting to note a few of these, such as the Magpie-Lark, "Yellow-belly," Leatherhead, Butcher-Bird, Miner, Satin Bower-Bird, Blackbird, Laughing Jackass, &c. The first two are by far the most numerous, and have the advantage that they follow their prey to the ground if they fail in their first attempt at securing it. Most of these birds are too small to swallow the grey-backs at one mouthful, but when one is near enough one can see that they beat the insect to pieces on the larger branches before attempting to 'down' it. Then, too, the quantity eaten by a single bird is limited, but they make up for this in numbers. Just after daylight there is a constant stream of the birds through the feeding trees of the beetles. As will be noted above, even the fruit-eating birds take kindly to the beetles during their nesting season—a fact which agrees with my experience in America, where most of the seed-eating birds feed their young upon insect diet.

"Protection of the bird-life of a country is certainly worth considering, for we cannot begin to estimate their value to man, even those that we sometimes class as enemies, when they occasionally eat our corn or kill our chickens. Undoubtedly birds are the greatest factor in the control of insect pests. Theoretically, almost any minute insect, with its rapid method of multiplication, would overrun the earth, making it impossible for man or other animals to exist if the offspring of the insect all survived and reproduced.

"This has been forcibly illustrated by T. Bainbrigg Fletcher in his work on 'Some South Indian Insects,' where he takes the case of an insect laying only 200 eggs, and having a life-cycle of one month. Starting with 1st January for convenience, a single fertilized female lays 200 eggs, of which, on the average, half will be females, each of which will lay 200 eggs on 1st February. By the end of February we have $100 \times 200 = 20,000$ mature insects. Continuing, simple calculation shows that, by the end of the year, the descendants would reach the prodigious total of two septillions ($2,000,000,000,000,000,000,000,000$) of individuals. The human mind is quite incapable of grasping the significance of such a figure, but a few comparisons may assist the imagination. If 1,000 of the insects weighed only 1 oz., their united weight would be 558,035,718,571,425.5 tons, and if 1,000 measured one cubic inch they would cover an area of almost 50 billion square miles with a uniform layer one inch deep. Taking the dry surface of the whole earth to be 51 millions of square miles, they would cover the whole of this to a depth of over 81 feet.

"Figures such as these are suggestive of what may take place if an insect meets with particularly favourable conditions for development. Probably the most important of these are—(1) favourable climate, (2) abundant food, (3) freedom from enemies. Nature is usually nicely balanced, so that no species becomes predominant. Man, however, is often the means of upsetting this balance by transferring insects to new countries, where, removed from their natural enemies, they often become serious pests; or, again, by cutting the forest he interferes with the nesting of insectivorous birds, &c., with the result that his crops are destroyed until Nature is again able to maintain her balance.

"It is now well recognized that man is able to greatly assist Nature in regaining this equilibrium; and much has been done by the introduction of insect parasites. It is possible, however, to do just as important work by encouraging the birds through protection, &c., so that they will multiply near our homes."—From *Daily Mail*, Brisbane.

SHOOTING WILD DUCKS.

TWO YOUNG FELLOWS CONVICTED.

Further prosecutions were initiated in connection with the close season by the secretary of the Native Birds' Association (Mr. P. V. Maloney) in the Rockhampton (Q.) Summons Court recently, when two young fellows, Fred. Fox and Stanley Moore, were charged with having unlawfully killed wild Ducks during the close season. The defendants pleaded guilty.

Mr. K. Allen (instructed by Rees R. and Sydney Jones), who appeared for the complainant, stated that about half-past 7 o'clock on Sunday evening, 17th November, Constable Bahr intercepted a motor-car driven by Harry Green, containing six passengers, amongst whom were the accused. The constable said that complaints had been made about shooting Ducks, and asked

if there were any Ducks in the car. Not receiving a satisfactory reply, the car was taken to Quay-street, and there were a dozen Ducks in the car and some Pigeons. Moore said he had shot three Ducks, and Fox two: the balance, it was stated, by Yaamba boys. The complaint had been made by Mr. Maloney, secretary of the Native Birds' Association, and there had been several prosecutions, but they did not appear to have had much effect, and he would ask for an increase in the penalty.

The Police Magistrate (Mr. Hishon) imposed a penalty in each case of £1, with 6s. costs of court and £2 2s. professional costs, in default 14 days' imprisonment.

Additions to the Library.

BY W. B. ALEXANDER, M.A., HON. LIBRARIAN.

I.—BOOKS.

"The Birds of Australia." G. M. Mathews. Vols. i.-vi.
(Presented by Mr. H. L. White.)

This most valuable and generous gift was acknowledged in the last number of *The Emu*, where a full notice appeared.

"Nests and Eggs of Australian Birds." A. J. Campbell.
(Presented by the author.)

The Union is greatly indebted to Mr. Campbell for his present of a specially-bound copy of his well-known work, in two volumes. The book is so familiar to all Australian ornithologists that a review would be superfluous. The copy bears the following inscription:—"Presented to the Royal Australasian Ornithologists' Union, and in Undying Memory of Those Members who fell in the Great World-War, by its Fifth President and Honorary Member, the Author. January—the 'year of peace'—1919."

"A Monograph of the Pheasants." W. Beebe. Vol. i. From the publishers, Witherby and Co., 326 High Holborn, London, England.

There is little doubt that this is the most magnificent book on birds yet produced, and it is an undoubted tribute to the excellence of Messrs. Witherby's work that a book published under the auspices of the New York Zoological Society should have been entrusted to this English firm. Moreover, the majority of the beautiful coloured illustrations in this first volume are by the well-known British artists, G. E. Lodge and A. Thorburn.

The Pheasants rival, if they do not surpass, all other families of birds in the brilliance and magnificence of their plumage; yet in their native haunts most of them are difficult to study, owing to the thick jungles and mountainous regions which they commonly frequent. The author devoted 17 months to the study of the

birds in their natural surroundings, and as a result the account of each species is adorned not only with a beautiful coloured plate of the birds in their native haunts, but also with splendid photographs of typical habitats. Views of the scenery of Ceylon, India, Burma, China, Japan, the Malay States, Borneo, and Java are thus presented, and the views range from the tops of the Himalayas to the shores of the tropical seas. Possibly the author's word-pictures of the scenes in which he studied the birds give an even more vivid impression than the actual illustrations. At all events, the accounts of the individual birds are worthy of the illustrations. The Pheasants are treated from every aspect. Their life-histories, plumages, variation, &c., their history and treatment under domestication, methods of hunting them, and native legends concerning them, are all recorded.

The first volume deals with 17 species and 7 sub-species grouped in four genera—namely, Blood Partridges (*Ithagenes*), Tragopans (*Tragopan*), Impeyan Pheasants (*Lophophorus*), and Eared Pheasants (*Crossoptilon*). There is also an introduction, treating of Pheasants in general.

The work is to be completed in four volumes, which subscribers can obtain at £12 10s. each.

“The Australian Environment, Especially as Controlled by Rainfall.” Dr. Griffith Taylor. Memoir No. 1 of the Commonwealth Advisory Council of Science and Industry. (Received in exchange.)

This is a very suggestive work for all who are interested in the geographical distribution of the animals and plants of Australia. The author has summarized many of the records of the Commonwealth Meteorological Bureau so as to show the connection between the seasonal distribution of the rainfall, the physiography, and the plant-life of Australia. The importance of uniformity of rainfall as compared with the actual amount of rain received during the year is shown by comparison of the map showing this uniformity with that of the distribution of the chief types of vegetation. The memoir is provided with coloured contour and rainfall maps for each of the fifteen regions into which the author divides the continent. These maps have been published separately as an atlas, constituting the only complete set of contour maps of Australia published hitherto. This atlas is obtainable from the secretary of the Advisory Council, 314 Albert-street, East Melbourne, for 1s. 6d., post free, and should prove useful to members of the R.A.O.U.

“Handbook of the Birds of Eastern North America,” 6th ed., 1899. (Presented by Mr. F. Keep.)

“An Introduction to the Birds of Australia” (1848). J. Gould. (Presented by Mr. G. H. Barker.)

This copy of a rare and little-known work by the “father of

Australian ornithology" bears an inscription—"To W. H. Flower from J. H. Gould." The book is not mentioned in Mr. F. H. Waterhouse's "Zoological Works of John Gould," and the Union is greatly indebted to Mr. Barker for such an interesting addition to the library.

"Handbook to the Birds of Australia" (1865). Two vols. J. Gould. (Purchased.)

This is a republication of the letterpress of Gould's famous "Birds of Australia," with the additional species described in the Supplement inserted in their proper places. Since, owing to its value, the large work presented to the Union by Mr. White has to be kept locked up, and is not available to ordinary users of the library, the "Handbook" should prove a very useful addition.

"Useful Birds of Southern Australia." R. Hall. (Purchased.)

"The Structure and Classification of Birds." F. E. Beddard. (Purchased.)

"The Evolution of Bird-Song." C. A. Witchell. (Purchased.)

"A Book-lover's Holidays in the Open." Theodore Roosevelt. (Purchased.)

An interesting series of papers on some of the late Mr. Roosevelt's experiences in various parts of the world. Chapter X. deals with the Bird Reserves at the mouth of the Mississippi, where, owing to the protection afforded by the State Conservation Commission of Louisiana and the Audubon Society, numerous colonies of sea-birds of different kinds which were threatened with destruction by eggers and plumage-hunters are now multiplying. The former President of the United States concludes his interesting account of the different birds to be found on the islands in the Gulf of Mexico with the following sentences, which are well worthy to be borne in mind and quoted by all interested in bird-protection in Australia:—

"The Audubon societies and all similar organizations are doing a great work for the future of our country. Birds should be saved because of utilitarian reasons, and, moreover, they should be saved because of reasons unconcerned with any return in dollars and cents. The extermination of the Passenger-Pigeon meant that mankind was just so much poorer—exactly as in the case of the destruction of the cathedral at Rheims. And to lose the chance to see Frigate-Birds soaring in circles above the storm, or a file of Pelicans winging their way homeward across the crimson afterglow of the sunset, or a myriad Terns flashing in the bright light of mid-day as they hover in a shifting maze above the beach—why, the loss is like the loss of a gallery of the masterpieces of the artists of old time."

II.—PAMPHLETS.

"Birds Collected in the Island of Polillo, Philippine Islands."

R. C. McGregor. (Presented by the author.)

One hundred and one species were obtained on this island, of which three are described as new. The avifauna is nearly related to that of the adjacent large island of Luzon, though many genera found on the larger island are not represented on Polillo.

"A Few Rare Birds from Luzon, Mindanao, and Mindoro."

V. T. Zimmer. (Presented by the author.)

Notes on the more interesting birds met with during the years 1913-1916 in the Philippine Islands. One species is described as new. Mr. Zimmer is now agricultural expert in the Territory of Papua, and has recently been appointed local correspondent of the R.A.O.U. for that region. We hope that he will contribute notes on the birds he meets with in New Guinea to future numbers of *The Emu*.

"Some Points of Similarity of Birds and Fishes." A. H. E. Mattingley. (Presented by the author.)

An address to the Victorian Fish Protection Society and Anglers' Club, in which the author discusses many interesting resemblances between birds and fishes, the dominant groups in air and sea respectively.

"The Birds of the Anamba Islands." H. C. Oberholser. U.S. National Museum Bulletin No. 98.

"Annotated Catalogue of a Collection of Birds Made by Mr. Copley Amory, jun., in North-Eastern Siberia." J. H. Riley. *Proc. U.S. National Mus.*, No. 2,255.

"The Principal Species of Birds Protected by Law in Egypt." S. S. Flower and M. J. Nicoll. (Presented by Trooper F. L. Berney.)

Contains strikingly beautiful illustrations of twenty-six of the principal insectivorous birds found in Egypt, with descriptive letterpress and Latin, English, and Arabic names.

"Our Birds." N. W. Cayley.

Reproductions of seven of this artist's pictures of Australian birds amid Australian flowers, published by the Aldenhoven Art Galleries, Sydney.

"Bird Photography for Amateurs." R. T. Littlejohns and S. A. Lawrence. In *Harrington's Photographic Journal*, vol. xxvii., No. 317, Oct., 1918.

This article is illustrated by excellent reproductions of a number of the authors' beautiful photographs of familiar birds.

"'Bird-Life' Supplement to the *Education Gazette of New South Wales*," Oct., 1918.

Contains numerous articles on different aspects of bird-life, including prize essays and poems by teachers and school children.

The list of 1,061 branches of the Gould League in New South Wales is in itself sufficient to show what valuable work is being accomplished by the League in that State. Some good bird-photographs illustrate this supplement.

III.—PERIODICALS RECEIVED IN EXCHANGE.

- British Birds*, vol. xii., parts 4, 5, 6, 7, 8.
Avicultural Magazine, vol. ix., parts 10, 11, 12; vol. x., parts 1, 2, 3.
Revue Francaise d'Ornithologie, vol. v., Nos. 110, 111.
Bird Lore, vol. xx., parts 4, 5, 6.
Australian Naturalist, vol. iv., part 4.
Victorian Naturalist, vol. xxxv., parts 5, 6, 7, 8, 9, 10.
University of California Publications in Zoology, vol. xiv., part 2; vol. xviii., part 14; vol. xxi., part 1.
Hawkesbury Agricultural College Journal, vol. xv., parts 11, 12; vol. xvi., parts 1, 2.
Condor, vol. xx., part 5; vol. xxi., part 1.
Proceedings of the Academy of Natural Sciences of Philadelphia, vol. lxxix., part 3; vol. lxx., parts 1, 2.
Proceedings of the Royal Society of Queensland, vol. xxx. (1918).
Memoirs of the Queensland Museum, vol. vi.
South Australian Ornithologist, vol. iv., part 1.
Auk, vol. xxxv., part 4.
Proceedings of the Linnean Society of New South Wales, vol. xliii., part 3.
Ibis, vol. vi., part 4.
Proceedings of the California Academy of Sciences, vol. vii., parts 12, 13; vol. viii., parts 1, 2, 3, 4.
Report of the Public Library, Museum, and Art Gallery of South Australia for 1917-18.
Annual Report of the Smithsonian Institution for 1916.
Annual Report of the U.S. National Museum for 1917.

ARTICLES IN THE FOREGOING PERIODICALS ON AUSTRALASIAN BIRDS.

- "An Ornithological Trip to the Nhill District," by F. E. Wilson.
Victorian Naturalist, vol. xxxv., No. 6, p. 93; No. 7, p. 111.
An account of the types of country found about Winiam East, 10 miles south of Nhill, bordering the northern fringe of a so-called desert, with observations on the birds met with. A list of 85 species observed in the locality is given.

- "White Swallows," by G. J. Flood. *Victorian Naturalist*, vol. xxxv., No. 7, p. 120.

Mr. Flood records the occurrence of two white birds in the brood reared by a pair of Welcome Swallows in a shed near Moorooduc, Victoria, two years in succession.

"Advanced Australia: Second Anzac Number."

The *Avicultural Magazine*, vol. ix., part 10, bears this title, and is devoted to articles and notes on Australian birds.

"Description of a New Sub-Species of *Climacteris*." J. W. Mellor. *South Australian Ornithologist*, vol. iv., No. 1, p. 5.

The White-browed Tree-creeper found in the belts of pine and mallee country adjacent to the River Murray, in South Australia and Victoria, is distinguished from the Central Australian form under the name of *Climacteris erythrops parsonsi*.

"The Birds of the South-Eastern Part of South Australia." A. M. Morgan. *South Australian Ornithologist*, vol. iv., No. 1, p. 7.

Dr. Morgan gives a list of the birds found in this region, resulting from visits paid by him to Mount Gambier, the Glenelg River (in Victoria), Beachport, Robe, and Narracoorte, in November, 1918. One hundred and twenty-two species are recorded. Among the most interesting may be mentioned the Orange-bellied Grass-Parrot (*Neonanodes chrysogaster*), which had not been recorded in South Australia since 1885, and the Swamp-Parrot (*Pezoporus terrestris*), of which species a few still survive on the flats at the mouth of the Glenelg River.

ARTICLES OF GENERAL ORNITHOLOGICAL INTEREST.

"Colour Vision and Colour Sensation in Birds," by Prof. R. Dubois. *Revue Francaise d'Ornith.*, vol. v., p. 265.

A suggestive article, pointing out how little is known as to the power of birds to distinguish colours, and as to the emotions aroused in them by particular colours.

"Some Breeding Habits of the Sparrow-Hawk," by J. H. Owen. In *British Birds*, vol. xii., part 4, p. 74.

Mr. Owen concludes a very remarkable series of studies on the English Sparrow-Hawk which has been appearing in that journal, and is illustrated by excellent photographs. The articles are well worthy of perusal by every ornithologist, and are a striking illustration of the results obtainable by a field naturalist who devotes himself to the close study of a single species in its native haunts.

"The Behaviour and Mouth-Coloration of Nestling Birds," by W. R. Butterfield. *British Birds*, vol. xii., p. 87.

The writer considers that the bright colours inside the mouths of nestlings, and their habit of displaying these when the nest is approached, are intended to alarm possible enemies, and quotes evidence in support of this view.

"Egg-Carrying by Birds," by T. Steel. *Australian Naturalist*, vol. iv., p. 52.

The author observed that a domestic hen, whose eggs had been removed from the nest, carried them back over an obstacle by pressing them against her breast with her beak, and suggests that perhaps Cuckoos convey their eggs in the same manner, and not actually in the beak, as is commonly supposed.

"How Birds-of-Paradise are Caught," by An Old Australian Bird-Lover. *Avicultural Magazine*, vol. ix., p. 274.

An interesting account of the methods employed by a bird dealer in obtaining live specimens of Birds-of-Paradise and other rare species in New Guinea.

"Colour Change Without a Moults," by Dr. A. G. Butler. *Avicultural Magazine*, vol. ix., pp. 285-303.

"Evidence that Many Birds Remain Mated for Life," by F. C. Willard. *Condor*, vol. xx., p. 167.

"Problem: Do Birds Mate for Life?" J. E. Law. *Condor*, vol. xxi., p. 26.

"Evidence that Many Birds Remain Mated for a Number of Years." N. K. Carpenter. *Condor*, vol. xxi., p. 28.

The three articles on this subject mentioned above are very suggestive, and include many interesting observations. It would be interesting to have evidence as to the habits of Australian birds in this respect.

"Parasitism of Nestling Birds by Fly Larvæ." O. E. Plath. *Condor*, vol. xxi., p. 30.

The author finds that in America a considerable proportion of Passerine birds are subject, as nestlings, to the attacks of larvæ of a fly, which suck their blood. The fly, in its turn, is kept in check by a parasite, a chalcid wasp (*Nasonia brevicornis*), the same species which is being artificially reared in Australia to assist in checking the ravages of the sheep blow-fly. The attacks of the fly larvæ result in a considerable mortality amongst the nestlings. Do Australian birds suffer in this way?

"Birds of the Panama Canal Zone." W. Stone. *Proc. Acad. Nat. Sci. Philadelphia*, vol. lxx., p. 239.

The fact that no less than 432 species are now known from this comparatively small area shows the richness of the bird-life. Reference to this paper may be of interest to Australians who travel to Europe *via* the Panama Canal, as suggesting what birds they may see, though descriptions of the species are, of course, not included.

"Sexual Selection and Bird Song." C. J. Hawkins. *Auk*, vol. xxxv., p. 421.

"Cause of the 'Fishy' Flavour of the Flesh of Wild Ducks."
W. L. M'Attee. *Auk*, vol. xxxv., p. 474.

The author shows that the fishy flavour met with at times in Ducks and other birds is not caused by their feeding on fish, as is commonly supposed, but is probably due to lack of condition and a consequent breaking-down of fats. A similar taste is sometimes found in butter and cheese under circumstances that preclude its being derived from fish. On the other hand, many birds that feed mainly on fish, and cattle and pigs fed on fish meal, commonly have no fishy taste.

"The Reversed Under Wing Coverts of Birds and their Modifications." G. L. Bates. *Ibis*, vol. vi., p. 529.

About Members.

MR. M. Symonds Clark, of Knightsbridge, South Australia, who is an original member of the R.A.O.U., celebrated his eightieth birthday on the 19th January last. We all congratulate Mr. Clark on his many years of usefulness, especially in bird-protection matters. The *Adelaide Register* gave a column extolling his work in that direction and his sterling character. Mr. Clark told his interviewer that when in England, the land of his birth, "I met the great J. Gould—that wonderful bird writer. I went to his place of business in London in 1865. He was a publisher, and I bought his book on the birds of Australia. He was a most interesting man, and chatted of the many new birds he had discovered in my adopted land." Mr. Clark first arrived in Adelaide in 1850, so he must have observed many Australian birds in their native haunts.

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JULY, 1918.

[Part 1.]

The Emu

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Official Organ of the ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION.



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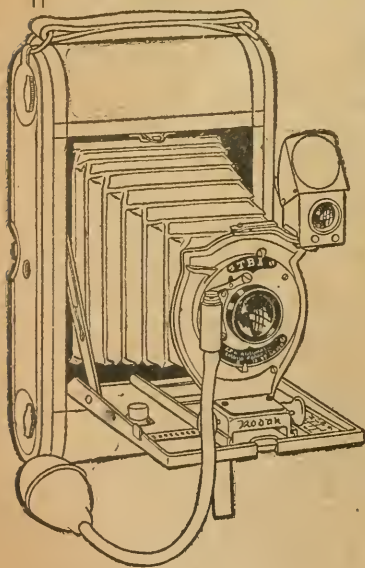
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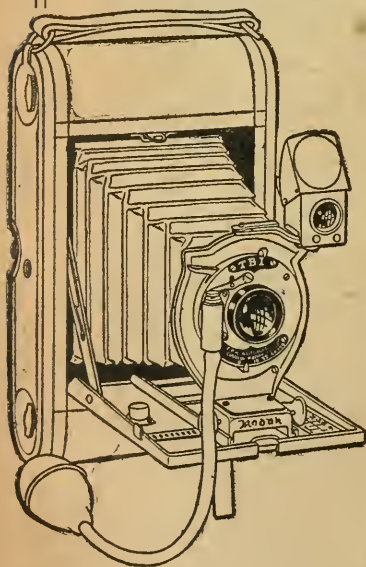
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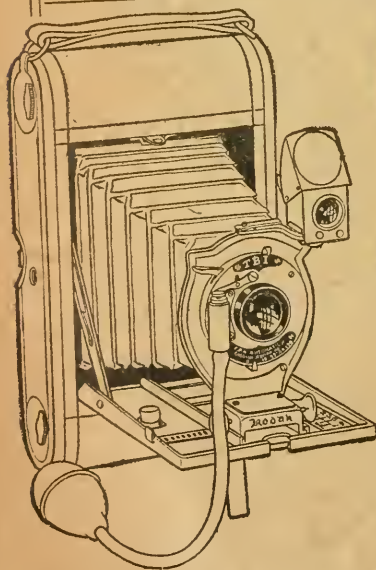
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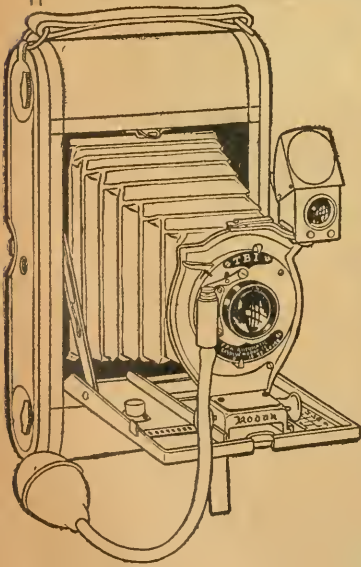
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